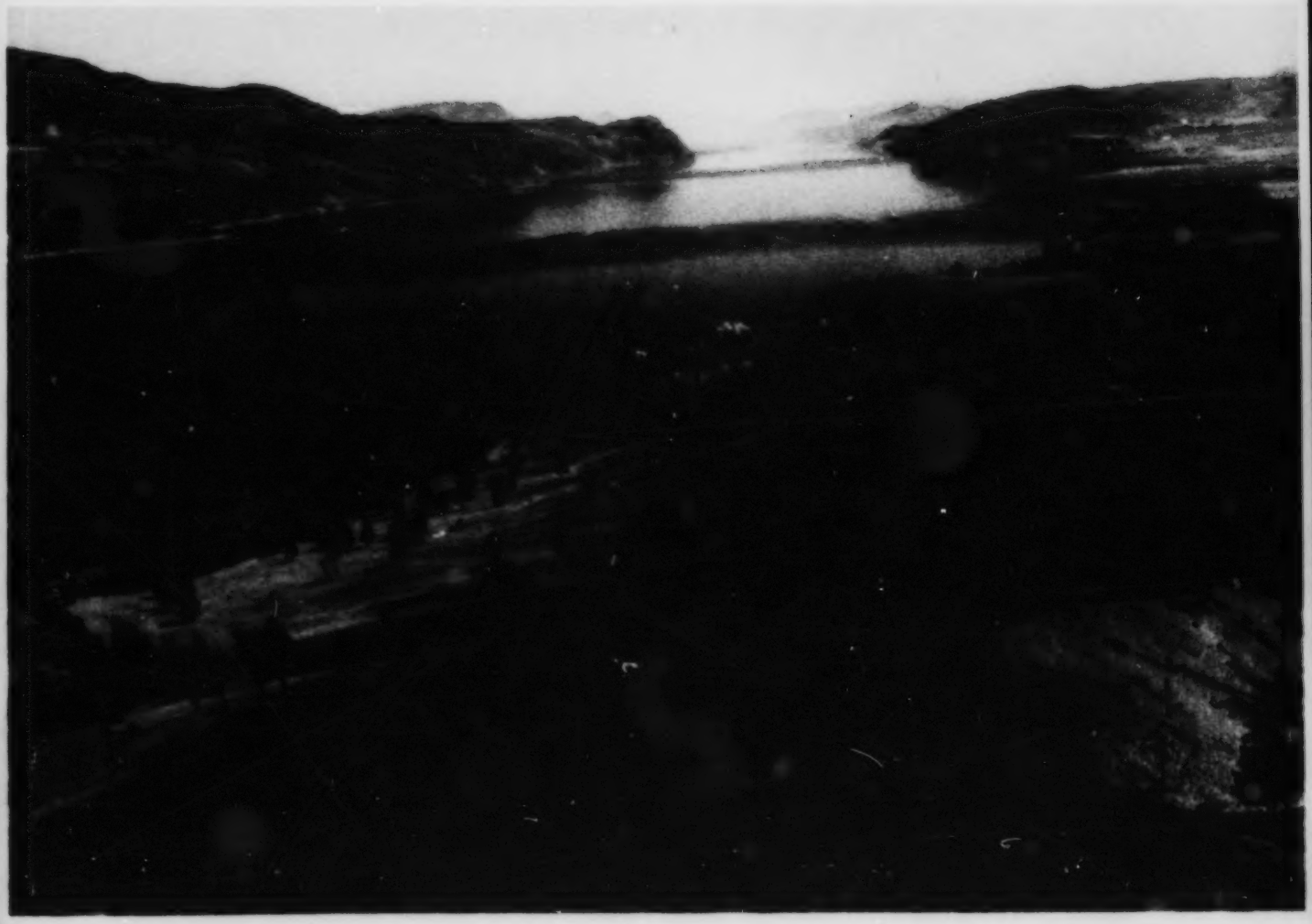
BC Environment

SOILS OF THE ASHCROFT MAP AREA



MOE TECHNICAL REPORT 23

ISSN 0375-5886

BC Environment

SOILS OF THE ASHCROFT MAP AREA

Report No. 26
British Columbia Soil Survey

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Integrated Management Branch
Victoria, British Columbia
1992

92-04278/

Canadian Cataloguing in Publication Data

Young, G. (Gavin), 1947–
Soils of the Ashcroft map area

(MOE technical report, ISSN 0821-0942 ; 23)
(British Columbia soil survey, ISSN 0375-5886 ; report no. 26)

Includes bibliographical references.
ISBN 0-7718-8560-1

1. Soils – British Columbia – Ashcroft Region. 2. Soils – British Columbia – Ashcroft Region – Maps. I. Fenger, M. A., 1949– . II. Luttmerding, H. A. III. British Columbia. B.C. Environment. IV. Title. V. Series. VI. Series: British Columbia soil survey ; report no. 26.

S599.1.B7Y68 1992 631.4'7'71172 C87-092050-2

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Acknowledgements

Gratitude is expressed to numerous individuals who have contributed to the preparation of this report, particularly to P.N. Sprout, and H.A. Luttmerding who provided soil correlation services and gave advice for the preparation of the report. Appreciation is also extended to R.J. Williams, who prepared the climate section in the introduction, and to J. van Barneveld, and J. M. Ryder, whose advice regarding forest zonation and surficial geology, respectively, provided the necessary information which helped form the basis of the soils report. Thanks are also extended to Dr. A. van Ryswyk, R. Mitchell and Dr. A. McLean in Kamloops for reviewing the report.

Thanks is also due to Barb Webb who did the initial word processing and to Christine Keumper who completed the first draft. Thanks to Anne Hanson and Hally Hoffmeyer who helped with the generalizing of the figures. Thanks also to Darla Cooper who incorporated all the initial editorial comments and Ron Walker who laid out the report and drafted the figures.

Credit must also go to many others too numerous to mention who contributed both in the field, laboratory and office.

G. Young was the party chief in charge of the soil mapping in the early 1970's and prepared a first draft of Chapters four and five of the soil report before leaving government service. At that time, M. Fenger assumed the responsibility for completing the project by adding Chapters one to three and the Appendices, as well as clarifying the Tables in Chapters four and five.

Specially acknowledged is the Land Resource Research Centre, Agriculture Canada, Ottawa for providing the cartography and printing of the soil maps in the map pocket at the end of this report.

Also acknowledged is Desktop Publishing Ltd., who prepared the publication-ready manuscript of the report.

Cover Photo: Kamloops Lake

Photo by: D.A. Demarchi

Abstract

This report describes the soils, landforms and the environment of the Ashcroft map area, located in south central British Columbia between 120° and 122° west longitude and 50° 00' to 51° 00' north latitude. The report consists of five chapters. The first provides a general overview of natural characteristics of the map area, including bedrock, surficial materials, vegetation zones and climate. This information is abstracted from previous surveys and studies from a wide variety of disciplines. A brief history of land use, present economic activities, and resource capabilities is also included.

Survey methods, reliability, and scale are discussed in the second chapter of the report. The initial steps for stratifying the landscape and constructing the map legend are explained.

A general overview of the soils, soil classification (which follows the 1973 Soil Classification for Canada) and groupings of soil associations is presented in the third chapter of the report. Cross sectional diagrams and oblique aerial photographs are used to show the different types of landscapes in the area. The chapter also provides an understanding of how various types of soil developed in the area.

The fourth chapter describes the individual soil associations and their respective components. Each soil association is described in terms of its physiographic region, vegetation zone, bedrock and landforms. A description of extent, distribution and soil development of major and minor portions of the components is given. Soil textures, coarse fragment content and drainage are also indicated.

The first part of the fifth chapter describes the capability rating classes and subclasses for forestry, agriculture and grazing use. Class and subclass limitations are then assigned to each soil association in tabular form. The second portion of this chapter describes basic concepts for understanding soil fertility by discussing soil parameters measured in the laboratory such as soil reaction, organic matter content, phosphorous, nitrogen, cation exchange capacity and base saturation. General soil fertility ratings are then assigned to each soil association in tabular form. The third portion of this chapter provides surface soil erosion and mass movement hazard ratings for all soil associations. The fourth portion of this chapter describes some soil properties significant to engineering such as depth to watertable and bedrock, texture (unified classification) and percent sand, silt and clay for each soil association. The final portion of the chapter describes the soil parameters used for assigning suitability ratings and limitations to each association for uses such as septic tank absorption fields, sewage lagoons, shallow excavations, sand and gravel sources, irrigation and topsoil.

Appendix A describes all previous soil surveys within and adjacent to the Ashcroft map area. Appendix B provides a complete list and shows the locations of described and sampled soil associations. Appendix C contains soil profile descriptions and chemical analyses for the more widespread and important soil associations in the map area.

The map pocket in the back of the report contains 1:100 000 scale soil and landform maps for the Kamloops, Merritt, Ashcroft and Lytton map sheet areas.

How to use the soil and landform report and maps

This report describes the soils, the environment in which they occur, and their suitability (or limitations) for specific uses. The maps at the back of the report show the distribution and extent of various soil associations and landforms. Individual soil associations and landforms are identified by unique symbols whose characteristics are briefly described in the map legend. A more thorough description of the soil associations is contained in this report.

The soil and landform maps may be used by planners, managers, and researchers to evaluate a wide variety of land uses. The maps represent reconnaissance scale of survey and are intended as an overview for planning purposes and general management decisions. Site specific applications will require additional on-site inspection.

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1:100 000 Soil/Landforms 92I/SE Merritt . . . . . back pocket

Plate 1: Cache Creek to Hat Creek

Cache Creek is located on coarse textured, rapidly drained soils of the Godey association. Since this oblique aerial photograph was taken (1952), most of the fluvial fan has been developed for urban uses. The Bonaparte River floodplain consists of poorly drained, saline, stone-free soils of the Frisken association. Adjacent to the floodplain are basic, medium to coarse textured soils of the Cache Creek association. The grassland soils near McLaren Lake belong to the Mossey soil association while these in Upper Hat Creek mainly belong to the Medicine association. The forested soils between Cache Creek and Upper Hat Creek are primarily morainal soils of the McLaren association. B.C. Photo 653:68.

CHAPTER ONE

Introduction

1.1 Location, Extent And Access

The Ashcroft map area (NTS 92 I) is situated in south-central British Columbia and occupies a large part of the Interior Plateau (Figure 1). The map area lies between 120° and 122° west longitude and between 50° and 51° north latitude. It is about 143 km (88 mi) from east to west and 110 km (68 mi) from south to north. It occupies about 15 500 km^2 (6000 mi^2) or 1.5 million ha (3.8 million acres).

The largest city, Kamloops, is located on the Trans-Canada Highway and is serviced by both Canadian Pacific and Canadian National railways. All three routes traverse the map area from northeast to southwest. Ashcroft and Lytton are other localized centres on these major transportation routes. Merritt and Lillooet are joined by surfaced roads to the main transportation routes. Major highways also run north from the Trans-Canada Highway at Cache Creek and Kamloops. From these main surfaced roads there extends a network of secondary roads which provide good access throughout most of the survey area.

1.2 History

Interior Salish people were the first inhabitants in the survey area. This ethnic group spoke four different languages: Lillooet, Thompson, Shuswap, and Okanagan (Duff, 1964). There were semi-permanent villages along the Thompson and Fraser rivers, with villages also located near Douglas and Nicola lakes. Winter dwellings, known as keekiwillies, were more or less permanent while teepees were moved to a number of campgrounds during the summer (Balf, 1969).

In 1808, Simon Fraser travelled down the Fraser River and was the first European explorer to traverse the study area. While passing the mouth of the Thompson River, Fraser named the river after David Thompson, thinking he was exploring its headwaters. Thompson was actually on the Columbia River, however, and never saw the river that came to bear his name (Hutchinson, 1950).

Fur traders rapidly penetrated the area and in 1812 the Hudson's Bay Company established a post at Cum Cloups, the site where Kamloops is situated today (Balf, 1969). Fur traders and their pack trains were the main activity within the area until prospectors began to find gold along the bars of the Fraser River in 1856.

The Cariboo Gold Rush of 1858, although centred north of the Ashcroft map area, had a profound effect on the region, as gold seekers travelled along the Fraser and Thompson rivers to reach the gold fields. The Cariboo Wagon road was constructed to accommodate the gold seekers and the settlements of Lytton and Lillooet sprang into existence (Wade, 1979). The regional economy changed from fur trading to supplying goods and services to miners.

The demand for beef brought in cattle drives from the United States and started the ranching industry in the region. The natural grasslands were utilized for overwintering herds before proceeding to the Cariboo gold fields (Lutz, 1980). Settlers were allowed to pre-empt 160 acres with full title after improvements were met. Land prices were attractive and ranchers formed the nucleus of the new interior settlements (Weir, 1955). Some of the gold seekers turned to ranching, establishing ranches such as

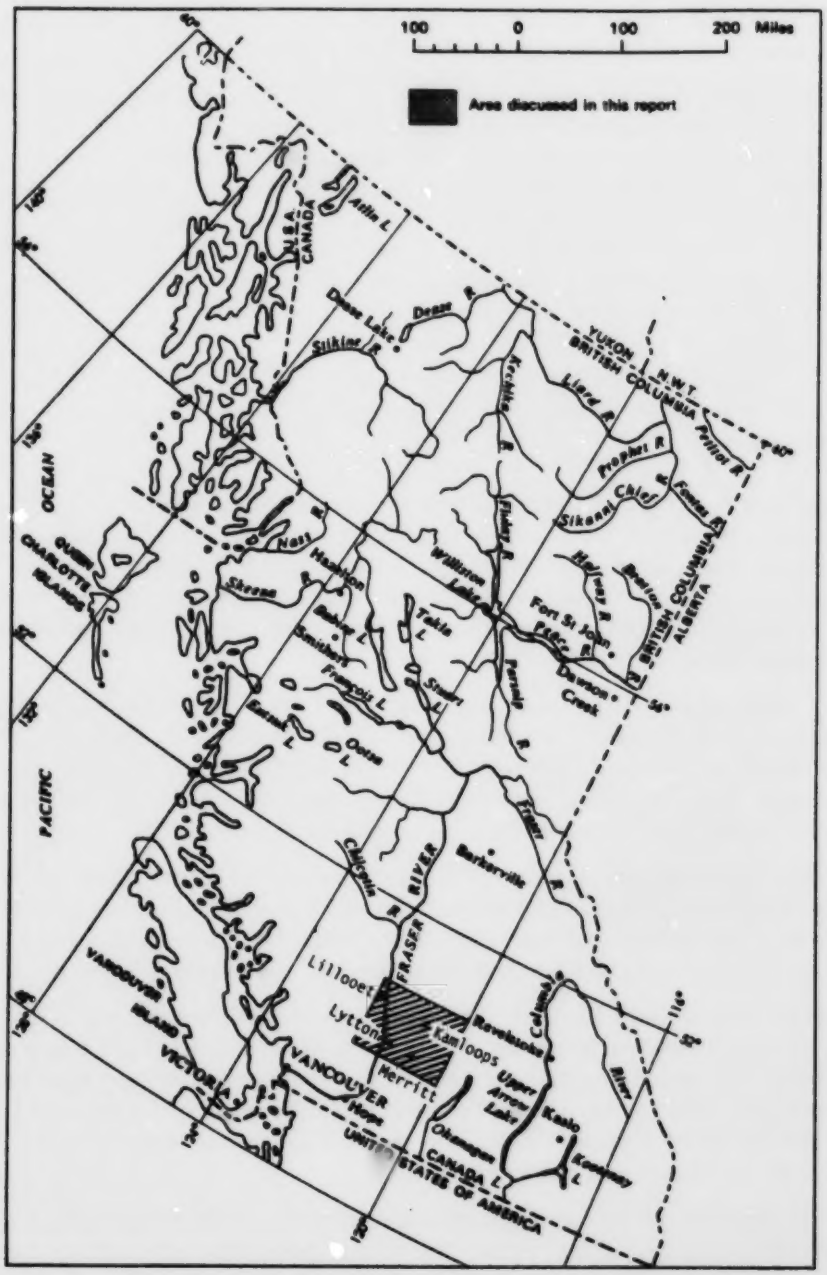


Figure 1. General map showing the area covered by the survey.

Quilchena. The Douglas Lake Cattle Company cornered the market for supplying cattle to the Canadian Pacific Railway, which began survey and construction through the study area in 1871 (Wooliams, 1979).

The Canadian Pacific Railroad (CPR) brought changes both during construction and after when the region was connected to the rest of Canada. Sternwheelers plied Kamloops Lake and the North and South Thompson rivers to supply the railroad construction gangs. Sternwheelers were also used on the Fraser River north of Lytton during the gold rush days.

1.3 Economic Activity

The economy of the Ashcroft map area is divided between mining, forestry, agriculture, transportation, and recreation.

Several large copper mines are located in the map area, mainly in the Highland Valley, some of which also produce molybdenum and other metals. Large deposits of coal occur in the Hat Creek Valley.

Cattle ranching is the major form of agriculture within the study area. The open to semi-open grasslands below 1000 m elevation are well suited for the production of cattle. There are many ranches of varying size; the largest is the Douglas Lake ranch east of Merritt. Irrigated forages used for winter feeding are grown where the soils are suitable.

The warm summer temperatures associated with the lower elevational areas along the Thompson and Fraser rivers enable production of some fruit and vegetable crops with irrigation. There is, however, some risk of winter damage due to cold temperatures.

The major highways which cross the study area generate their own economies and are the mainstay of places such as Cache Creek. The major railway routes which cross the study area also add to the economy.

Recreational fishing, boating, hunting, and hiking are good and tourism is becoming an increasingly important industry.

1.4 Climate

The Coast Mountains have a marked effect on the climate of interior British Columbia, including the Ashcroft map area. The mountain range impedes the flow of moist Pacific air masses into the Interior and the movement of cold Arctic air masses from the Interior to the Coast.

Winter outbreaks of very cold Arctic air occasionally penetrate the valleys of the study area. Winter temperatures of -20°C in valley bottoms are not uncommon and extreme winter minimum temperatures near -40°C have been recorded. During the fall and winter months inversion conditions often result in stable, overcast or foggy conditions which may persist for several days.

In both summer and winter, air masses from the Pacific move inland and are uplifted as they pass over the Coast Mountains. The lifting cools the air and condenses the water vapour, resulting in heavy precipitation on the windward side. As the air mass descends on the leeward side it is much drier and warms at a rapid rate, producing the familiar warm and dry climate of the southern Interior.

Precipitation within the map area decreases slightly from the west towards the centre, then gradually increases from there to the eastern boundary. Seasonal (May to September) precipitation in the major valleys averages near 100 mm, and ranges from a low of 90 mm at Lytton and Ashcroft to a high of about 130 mm in the Kamloops area. Precipitation increases rapidly with increasing elevation, with the western portion of the survey area being somewhat drier than the eastern. In the west, the 200 mm seasonal precipitation isoline occurs between an elevation of 1300 to 1400 m. In the east, the same isoline is between 1000 to 1200 m. Long term winter precipitation data are available at only a few selected valley bottom stations (Table 1). These data indicate that for most stations 25 to 35% of the annual precipitation falls as snow. The effect of elevation on snowfall is also evident at the long-term stations where the percentage of October to April precipitation which falls as snow increases with elevation (Table 1).

The frost-free days, growing-degree days, climatic moisture deficit/surplus, and the climatic capability for agriculture shown in Figures 2 to 5 have been generalized from 1:100,000 scale maps. These climatic parameter maps, as well as additional maps showing the location of the climate stations in the Ashcroft map area and the May to September precipitation, are available from the same source as this publication and have been produced by Meterological Services Unit, Waste Management Branch, British Columbia Ministry of Environment. Marsh (unpublished) and Williams (unpublished) describe the methods and list the normalized data and parameters used to derive the climatological parameter maps.

Freeze-free period is a measure of consecutive days without freezing temperatures. Freeze-free period is highly variable throughout the area. Periods in excess of 180 days occur along the benches of the Fraser River from Lillooet to Lytton. Since cold air is more dense, it tends to collect in the valleys and depressional areas. This causes the freeze-free period on the valley sides to be greater than that at the lower elevation valley floors. An example is the freeze free-period of less than 110 days in the valley bottom at Merritt while on the adjacent hillsides it is in excess of 120 days. For conditions other than cold air pooling, increasing elevation results in a decreasing freeze-free period. In general, the freeze-free period is quite consistent at the higher elevations. For example, a freeze-free period of 80 days occurs consistently near 1200 m elevation (see Figure 2).

Growing-degree days is a measure of heat calculated by adding all mean daily temperatures above a threshold value of 5°C. A day in which the maximum temperature is 20°C and the minimum temperature is 10° has a mean of 15°C and would contribute 10 growing-degree days to a cumulative total. In springtime, growing-degree days are calculated from the first day of the first consecutive five day period in which the daily mean temperature is equal to, or greater than the 5°C threshold. Calculations cease in the fall on the last day of the last consecutive five days when the daily mean temperature is equal to, or greater than the same threshold value.

Growing-degree days in excess of 2600 occur in the western valleys of the map area near Lillooet, Lytton and Spences Bridge. The eastern portion of the study area is somewhat cooler with 2100 growing degree days occurring near Kamloops and 1900 near Merritt. This parameter decreases rapidly to 1100 at elevations near 1400 m and 1200 m, in the western and eastern parts of the map area, respectively (see Figure 3).

The difference between seasonal (May to September) precipitation and seasonal potential evapotranspiration is defined as the *climatic moisture deficit* (if negative) or surplus (if positive). Deficits in the major valleys range from 500 mm near Lytton and Spences Bridge, to 400 mm in the Merritt and Kamloops area, to 300 mm in the North Thompson River valley. In general, a balance between seasonal precipitation and potential evapotranspiration occurs near 1500 m elevation with the exception of the Douglas Lake plateau area where it occurs near 1350 m (see Figure 4).

Climatic Capability for Agriculture is based on a combination of heat, cold, and moisture as expressed by freeze-free periods, growing degree days, and climatic moisture deficit/surplus (Figures 2, 3 and 4).

The severe climatic moisture deficits in the map area limit the natural (unirrigated) climatic capability for agriculture of the major valleys to classes 5, 6 or 7. With irrigation, these areas improve to classes 1, 2 or 3, limited only by extreme winter minimum temperatures. Figure 5 shows the improved agricultural classes for the major valleys. In general, class 1 climatic capability for agriculture is found below 1000 m elevation and classes 5 to 7 above 1300 m elevation (See Figure 5).

Table 2 defines the combinations of heat, cold, and moisture which determine the Climate Capability for agriculture. As the growing-degrees increase and the freeze-free period lengthens, so does the range of crops which can be grown. Table 2 explains the classes in Figure 5. It should be noted that although the climate capability is class 1, the soil capability for agriculture within the same area is seldom class 1. Only a few of the soils are suitable since most have severe limitations for agriculture uses as can be seen when Figure 5 (Climate Capability) is compared to Figure 15 (Generalized Soil Capability for Agriculture).

Table 1. Climatic Statistics for Selected Stations

	Precipitation				Percentage October to April Precipitation as Snow
	Elevation (m)	Annual (mm)	May to September (mm)	Snowfall (cm)	
Kamloops	346	260.5	128.5	77.1	57
Merritt	590	254.4	90.7	87.6	53
Lytton	258	462.9	89.4	141.6	37
Ashcroft	305	212.5	104.9	49.4	46
Hat Creek	899	317.1	137.9	133.0	73
Barriere*					

	Freeze Free Period (Days)			Growing Degree Days (>5°C)	Climatic Moisture Deficit (mm)	Mean Temperature (°C)	
	Average	Max.	Min.			January	July
Kamloops	145	169	116	2 202	423.9	-6.0	20.9
Merritt	118	164	74	1 663	382.0	-7.7	17.5
Lytton	187	206	155	2 539	427.2	-3.6	22.0
Ashcroft	169	180	145	2 380	447.3	-6.5	21.4
Hat Creek	50	86	13	1 156	337.3	-11.0	15.1
Barriere*							

*Barriere is located slightly north of the Ashcroft map area on the North Thompson River.

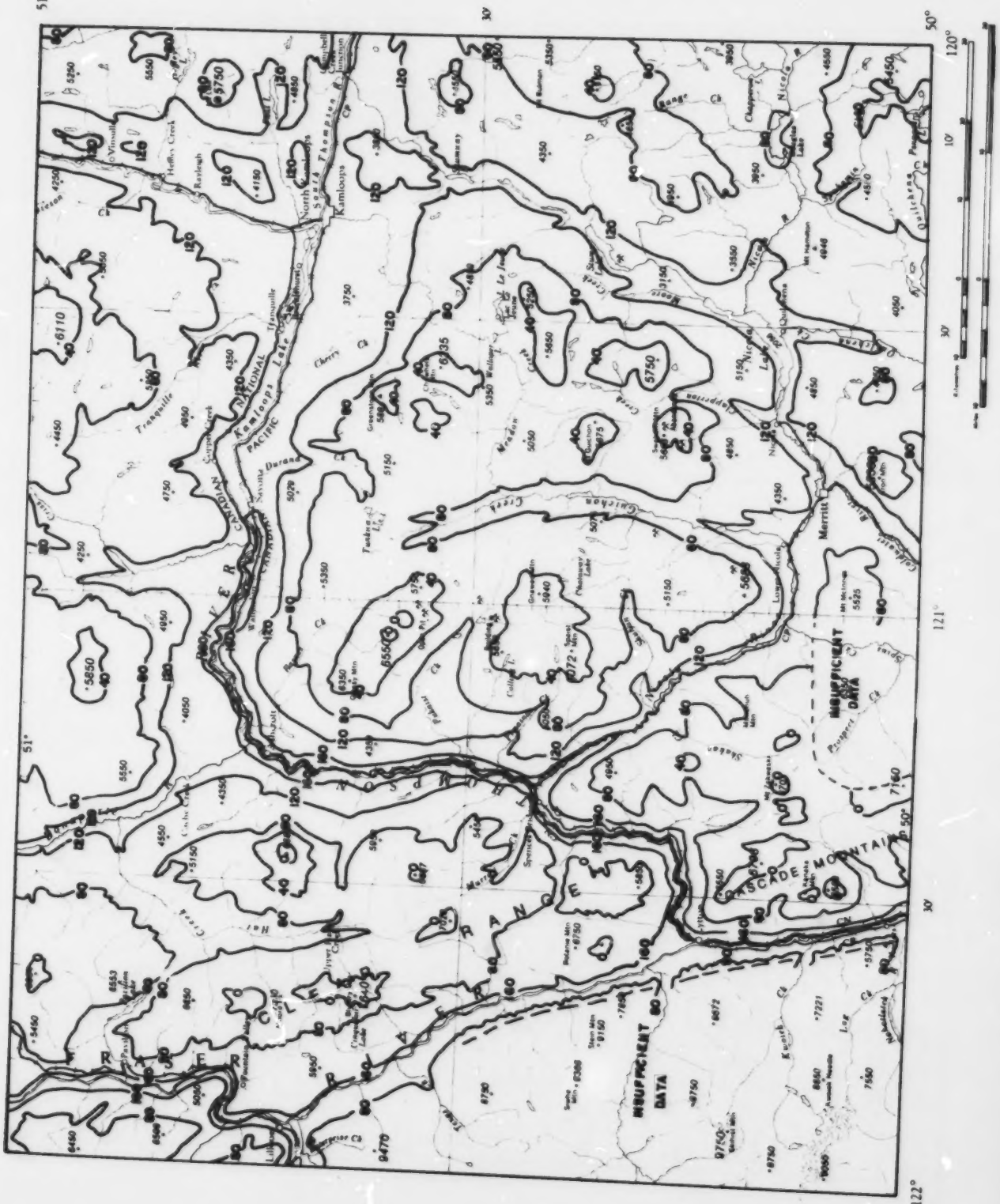


Figure 2. Freeze-free periods (days) of the Ashcroft map area.

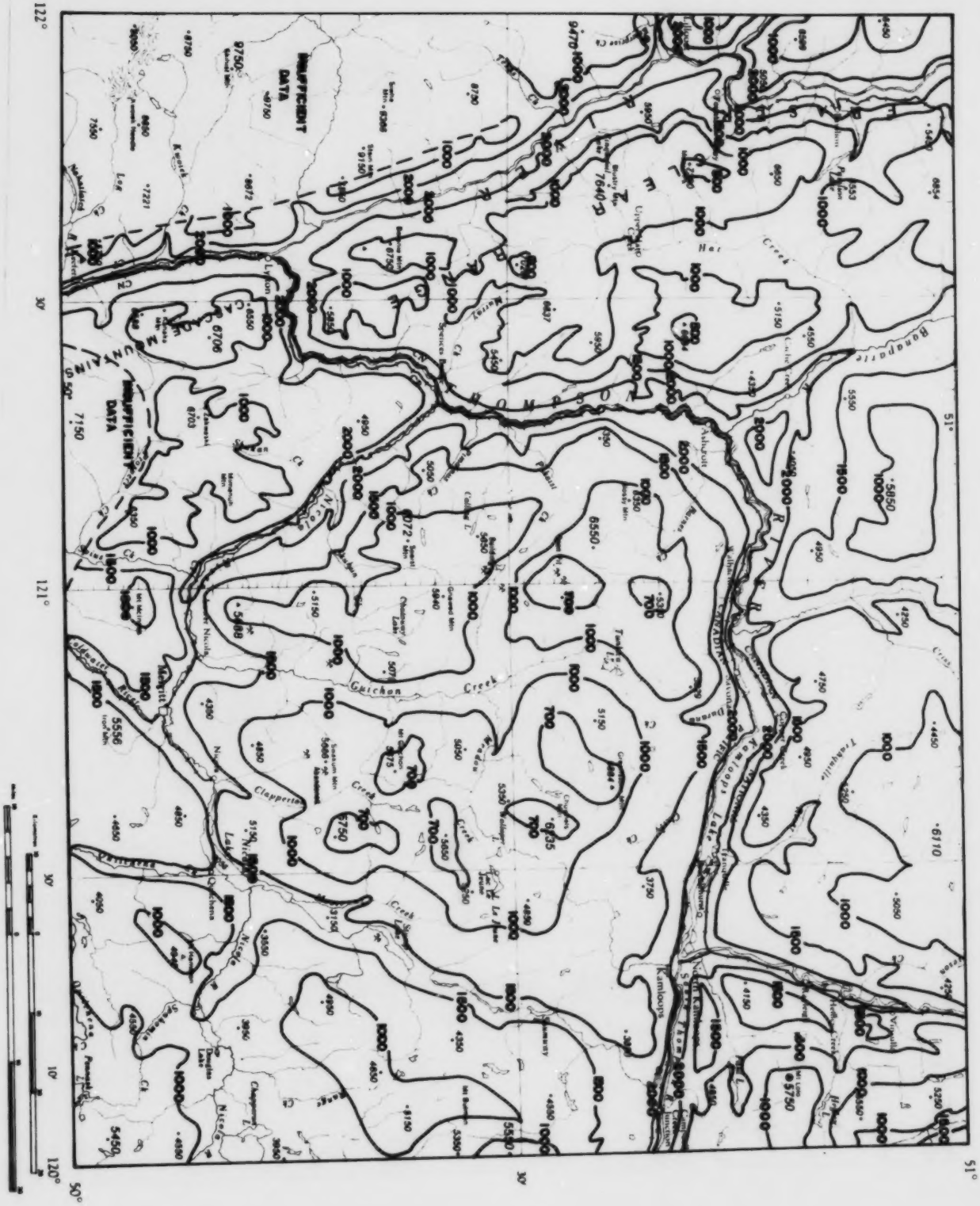


Figure 3. Growing-degree days of the Ashcroft map area.

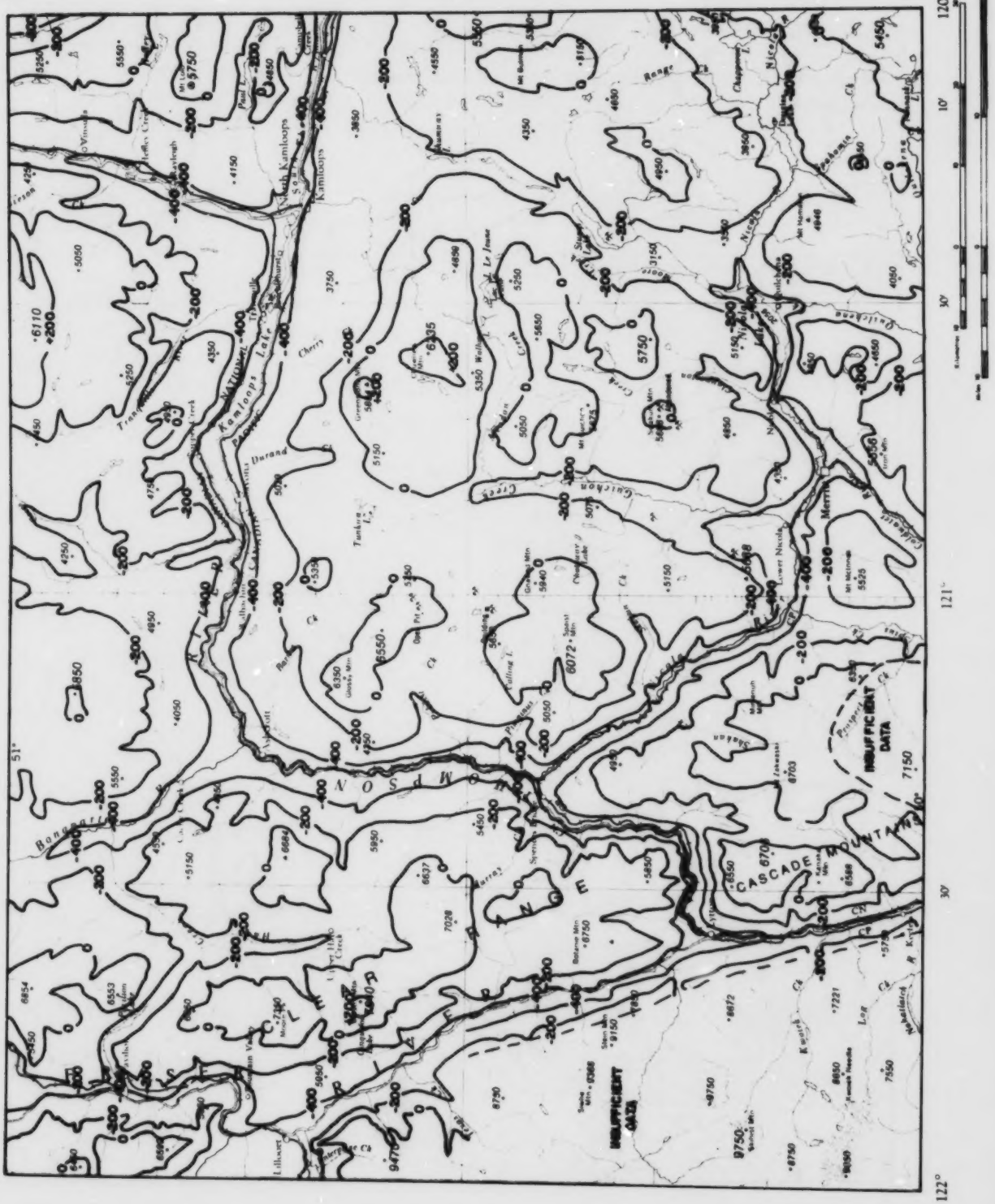


Figure 4. Climatic moisture deficit/surplus of the Ashcroft map area.

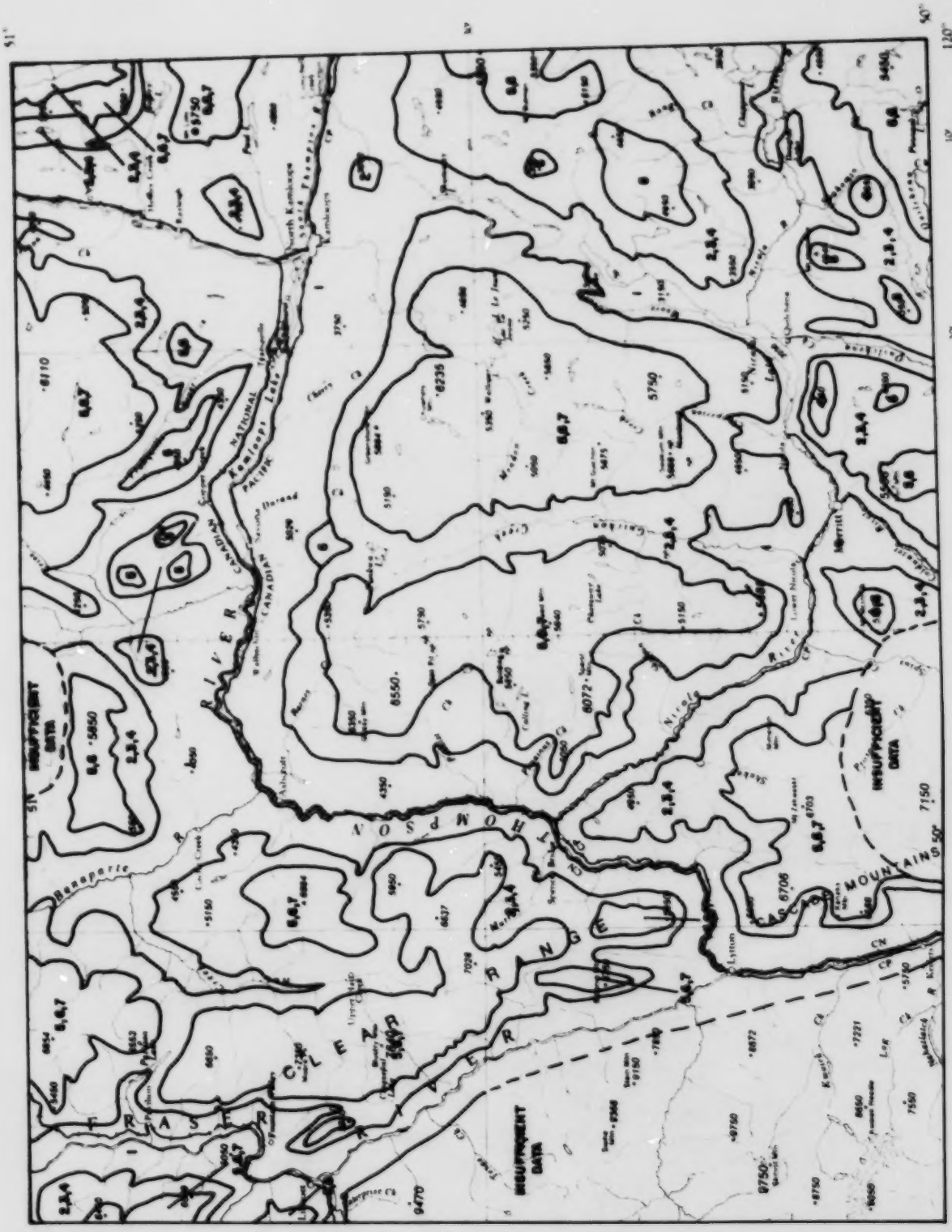

FRASER
THOMPSON
CLEARWATER
CASCADE MOUNTAINS
INSUFFICIENT DATA
INSUFFICIENT DATA
INSUFFICIENT DATA
Quesnel
Prince George
Williams Lake
Kamloops
Lytton
Merritt
Ashcroft
Cache Creek
Clinton
Lillooet
Pavilion
Bonaparte
Barriere
Chu Chua
Blue River
Valemount
Tete Jaune Cache
Dunster
Mount Robson
Jasper
Yellowhead Pass
Canoe
Avola
Chase
Salmon Arm
Sicamous
Revelstoke
Golden
Donald
Field
Lake Louise
Banff
Canmore
Cochrane
Calgary
Airdrie
Strathmore
Drumheller
Hanna
Oyen
Medicine Hat
Brooks
Bassano
Gleichen
Crowsnest Pass
Fernie
Sparwood
Elkford
Kimberley
Cranbrook
Creston
Yahk
Kitchener
Wasa
Fort Steele
Invermere
Radium Hot Springs

Table 2. Climate Capability for Agriculture Classes, as applied to the Ashcroft map area. (Classes are generalized from Resource Analysis Branch, 1978, and B.C. Land Inventory, 1972).

Class	Range of Crops	Freeze-Free Period (Days) (Figure 2)	Growing-Degree Days (Degree Days) (Figure 3)	Climatic Moisture Deficit (mm) (Figure 4)
1b	crops listed below plus: asparagus, peppers, melons, tomatoes, watermelons, cucumbers	>150	1780 to 2059	Irrigation assumed
1a	crops listed below plus: hardy apples	120 to 150	1505 to 1779	Irrigation assumed
1	crops listed below plus: corn	90 to 119	1310 to 1504	<40
2	crops listed below plus: asparagus, carrots, beets, leeks, brocolli, turnips, brussel sprouts, Swiss chard, wheat	75 to 89	1170 to 1309	40 to 115
3	crops listed below plus: strawberries, raspberries, potatoes, lettuce, peas, spinach, cauliflower. forage crops – alfalfa, sweet clover, brome grass and timothy. cereal crops – oats and barley.	60 to 74	1030 to 1163	116 to 190
4	mainly forage crops with some hardy cool season vegetables	50 to 59	1030 to 1169	191-265
5	only forage crops	30 to 49	780 to 1029	266 to 340
6	native grazing and browse	<30	670 to 779	341 to 415
7	no agriculture potential	<30	<670	>415

1.5 Physiographic Regions And Drainage

Physiographic regions, after Holland 1964, have been used as a primary stratification in delineating/grouping the soil associations of the Ashcroft map area (see Figure 6). Soil associations are unique to a physiographic region (see Tables 12 and 13, Chapter 4.7).

The **Thompson Plateau** is the most extensive physiographic region in the study area; it is bounded on the west by the Clear Range and Cascade Mountains. The transition to these ranges is gradual as the plateau surface rises gently towards the mountains; this is also true of the transition to the Shuswap Highlands which bound the plateau to the east.

The plateau surface is a gently rolling upland of low relief between 1220 and 1520 m elevation (4000 and 5000 ft), with more resistant rock rising above the old erosion surface to 1810 m (5940 ft) on Gnawed Mountain, 1726 m (5666 ft) on Swakum Mountain and 1693 m (5556 ft) on Iron Mountain (Holland, 1964).

The Thompson plateau drainage system is entrenched 300 m (1000 ft) to 600 m (2000 ft) below the general elevation of the plateau surface. The north and south Thompson rivers have relative low gradients above Kamloops Lake, but drop rapidly to join the Fraser River at Lytton. Kamloops Lake, 1330 m (1100 ft) is the largest lowest elevation lake in the study area. The Deadman, Bonaparte, and Nicola rivers have relatively low gradients in their upper reaches with steeper gradients in the final reaches as they descend to the more deeply entrenched Thompson River. Guichon, Quilchena, Clapperton, Hat, and Moore creeks are the major drainages originating on the plateau surface in the study area. Nicola, Stump, Trapp, Shumway, Lac La Jeune, Douglas, Mamit, and Pennask lakes all occur on the Thompson Plateau, about 300 m (1000 ft) above the elevation of Kamloops Lake.

The **Coast Mountains** lie to the west of the Fraser River and Fraser Fault Zone which coincides with the Fraser Valley. The Fraser River descends from 460 to 330 m (1500 to 1000 ft) elevation as it flows through the study area. The Coast Mountains contain the highest, most rugged peaks in the study area; Skihist Mountain rises to 2944 m (9660 ft) elevation and is the highest while Stein Mountain is 2773 m (9100 ft). Drainages such as Kwoiek and Texas creeks have steep gradients and empty directly to the Fraser River.

The **Cascade Mountains** lie east of the Coast Mountains and are separated from them by the Fraser River. These mountains are more subdued than the Coast Mountains and the degree of dissection is less. Mount Lytton 2043 m (6706 ft), Mount Zakwaski 2403 m (6703 ft) and Jackass Mountain 2008 m (6588 ft) are the highest in this physiographic region. There is a gradual transition from these mountains to the Thompson Plateau to the east.

Nicoamen River, Mowhokan, Prospect and Siska creeks are the major drainages.

The **Shuswap Highlands** consist of gently to moderately sloping plateau areas between elevations of 1520 and 1980 m (5000 to 6000 ft) and occupy only a small part of the map area in the northeast. Mount Lolo 1675 m (5500 ft) is the highest elevation in this physiographic region. The main drainage is provided by Louis and Heffley creeks.

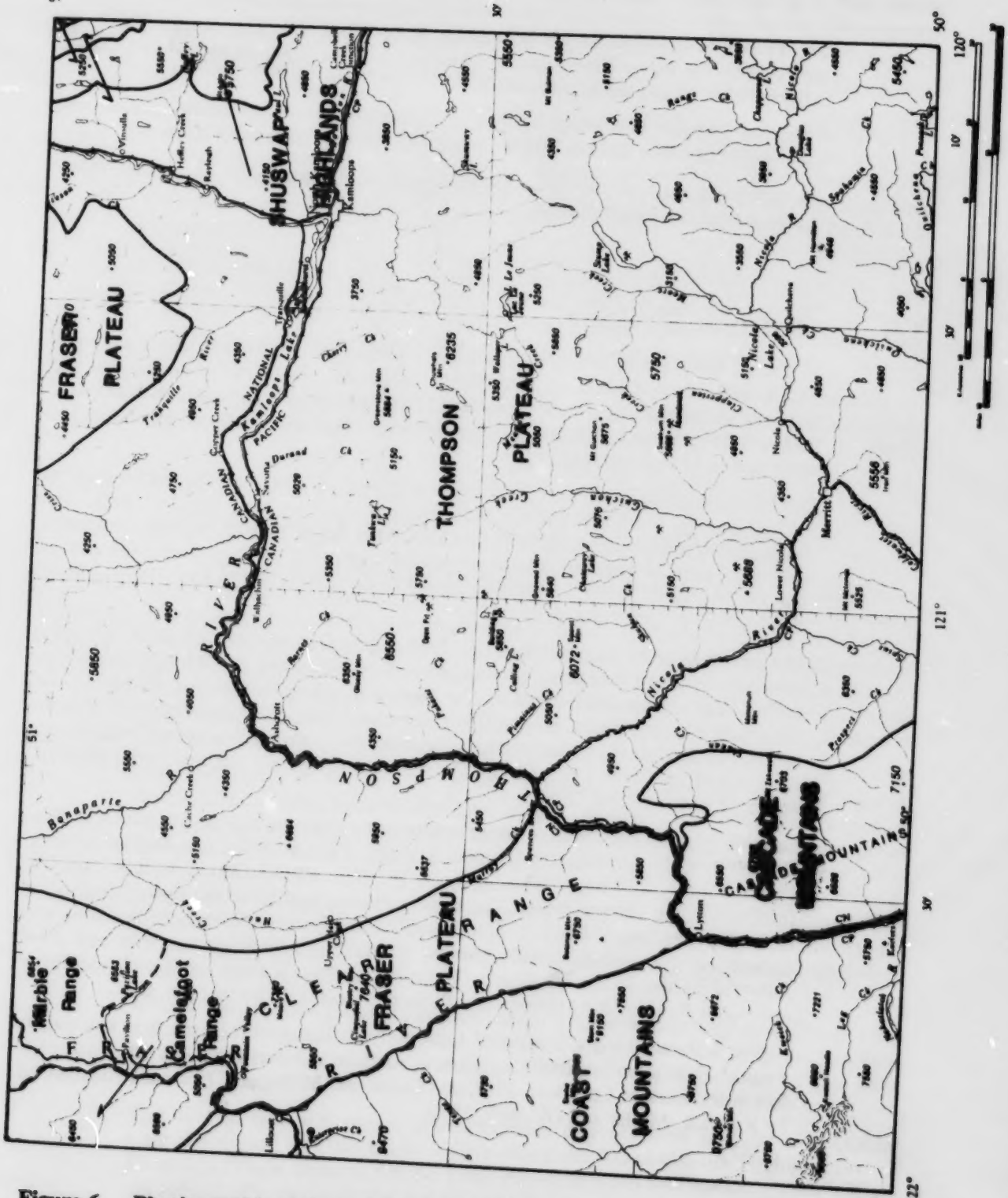


Figure 6. Physiographic regions of the Ashcroft map area, modified after Holland, 1964.

The **Fraser Plateau** consists in part of the Camelsfoot and Clear ranges which are separated by the Fraser River. Blustry Mountain 2328 m (7640 ft) and Mount Carson 2096 m (6877 ft) are the highest peaks.

Short, steep creeks drain these ranges on the west to the Fraser River, whereas the more gentle gradient streams of Hat Creek and Murray Creek drain eastward.

An area lying north of the Tranquille River and west of the North Thompson Valley is also part of the Fraser Plateau.

1.6 Bedrock Geology

A general overview of bedrock geology is necessary to develop an understanding of the distribution and kinds of soils that occur in the map area. The chemical and physical properties of bedrock types often determine or influence soil characteristics and soil development. Bedrock geology has been used as a means of separating soil associations in the map area.

The first comprehensive surveys of bedrock geology in the Ashcroft map area were carried out by Cockfield (1948), who mapped the east half, and by Duffel and McTaggart (1952), who mapped the west half. Since the initial mapping was completed, studies of specific bedrock groups or specific aspects of geology have been carried out by Mathews (1968), Mathews and Rouse (1963), McMillan (1978), Preto (1969), Schau (1968) and others.

The oldest bedrock in the map area is of sedimentary origin and dates from the Carboniferous and Permian Periods (285 million years ago to 200 my ago). These sedimentary rocks form parts of the Marble Canyon and Cache Creek groups (Roddick, Muller and Okulitch, 1979) and include thick limestone beds which make up the Marble Range. Some extrusive volcanic rocks dating from these periods also form part of the Cache Creek Group. The most extensive early volcanic rocks, however, are those of the Nicola Group.

Granitic plutons intruded the older sedimentary and volcanic rocks. The Guichon Batholith is the oldest, dating between Upper Triassic and early Middle Jurassic (approximately 180 my to 130 my ago). The Pennask and Mount Lytton batholith followed in the Mesozoic Era. The Scuzzy Pluton, located in the Coast Mountains, is the most recent. Volcanic andesites and basalts from the Mesozoic Era form the Spences Bridge and Kingsville Groups (Duffell and McTaggart, 1952) and were followed by the Kamloops Group. The most recent volcanics are the Plateau lavas and basalt flows of the Miocene and Pliocene Epoch (25 my to 1 my ago).

Figure 7 shows the distribution of bedrock types that generally result in soil parent materials with *similar* properties, such as reaction and nutrient status. The groupings follow the work of Cockfield, 1948, and Duffel and McTaggart, 1952, and summarized by Roddick, Muller and Okulitch, 1979.

1.7 Landforms and Surficial Materials (Soil Parent Materials)

Surficial materials are the unconsolidated deposits which overlie bedrock. The upper part of the surficial materials becomes altered through time by weathering and biological activities to form soil. The physical and chemical properties of the surficial materials largely determine the texture, structure, and fertility of the soil that form on them Surficial materials (landforms) were mapped in conjunction with soils in the Ashcroft map area.

The glacial history of the map area and the resultant surficial deposits have been studied in the east half by Fulton (1969 and 1975) and in the west half of the area by Ryder (1976 and 1981). A brief summary extracted from these publications and maps provides a general overview of how the present landscape evolved.

Four schematic cross sections, Figures 8 to 11, show the common surficial materials and stratigraphic sequences along the valleys of the Thompson and Fraser rivers and in the Upper Hat Creek Valley. These cross sections are after Ryder in Nicholsen *et al.*, 1982.

1.7.1 Glacial History

The map area was covered by ice during at least two glaciations separated by an interglacial period (Fulton, 1975). The last glaciation, named the Fraser Glaciation (Armstrong *et al.*, 1965), first built up ice in the Coast Mountains to the west and gradually expanded southeastward onto the Thompson Plateau. At the glacial maximum the zone of greatest ice accumulation was north and northwest of the study area and ice moved south and southeast. Fulton (1969) describes the glacial history and deglaciation events. Deglaciation was mainly by downwasting, with gradual exposure of upland surfaces although ice tongues remained in the valleys.

The persistence of ice in most valleys disrupted the preglacial drainage patterns. Large glacial lakes accumulated behind both stagnant and active ice tongues in many larger valleys, while in the smaller valleys lakes occupied the margins of the melting ice. Two types of ice dammed lakes occurred. Upland lakes were of short duration and left thin, patchy glaciolacustrine deposits while lowland lakes were of longer duration, and accumulated thick glaciolacustrine materials. The upland lakes were fed by relatively clean meltwater which came directly off the ice, whereas the lowland lakes were supplied by meltwater which carried large quantities of silt derived from the now exposed upland areas.

Upland glacial Lake Hamilton initially covered an area from Merritt to Stump Lake and east to Douglas Lake but later reduced in size to occupy only the lowlands between the present day Stump and Nicola lakes. It was then called Glacial Lake Merritt (Fulton, 1969).

The thickest and best known glaciolacustrine deposits were laid down in Glacial Lake Thompson and are easily visible along the Trans Canada Highway east of Kamloops. These deposits are the white silts first noted by Dawson (1894) and are the subject of a special report and maps by Buchanan and Evans (1977). These silts,

though not extensive in the map area, are of special concern due to their susceptibility to piping, gullying and slope instability, which cause problems for urban development and roads (see Figure 9 for schematic cross section and Figure 12 for distribution).

Morainal materials (glacial till) are the most extensive deposits in the map area. Thick till covers much of the mid to lower elevations on the Thompson Plateau, and many of these areas are drumlinized. The higher elevations on the plateau and localized hills and bluffs elsewhere are covered by shallow till interspersed with outcrops of exposed bedrock (see Figure 12).

Though not extensive, fluvioglacial deposits such as eskers, kames, and kame terraces occur in the major valleys, particularly along the Thompson River and Guichon Creek. The materials were deposited by flowing water near the ice margins and vary greatly in texture over short distances.

1.7.2 Recent Events

Since the disappearance of ice approximately 12,000 to 10,000 years ago (Clague, 1981), a variety of geomorphological processes have modified the map area. Landslides and debris flows were probably more frequent during immediate post-glacial time than at the present day and numerous alluvial fans formed soon after deglaciation (Ryder, 1971).

A number of large landslides have taken place in the Deadman River Valley in volcanic rocks of the Kamloops Group (Cruden and Evans, 1979). The Drynock earthflow on the Thompson River between Lytton and Spences Bridge is still active (Vandine, 1980) as are the Pavilion and Hat Creek earthflows (Bovis, 1980). Landslide scarps are shown on the surficial geology maps (Fulton, 1975 and Ryder, 1976, and 1981). Silty lacustrine deposits along the Thompson River are also failing. Colluvial deposits resulting from the action of gravity and weathering are most extensive in the steeper parts of the Coast Mountain and Fraser Plateau physiographic regions and are more localized elsewhere.

Extensive post-glacial terraces and floodplains have been deposited along the North and South Thompson rivers (Reid, 1974) and significant floodplains have developed along the Bonaparte and Nicola rivers.

Many of the surficial deposits in the map area have thin veneers of eolian materials. These are thickest and most continuous in the Thompson valley near Ashcroft.

Figure 7. Generalized bedrock groups for differentiating soil associations in the Ashcroft map area.

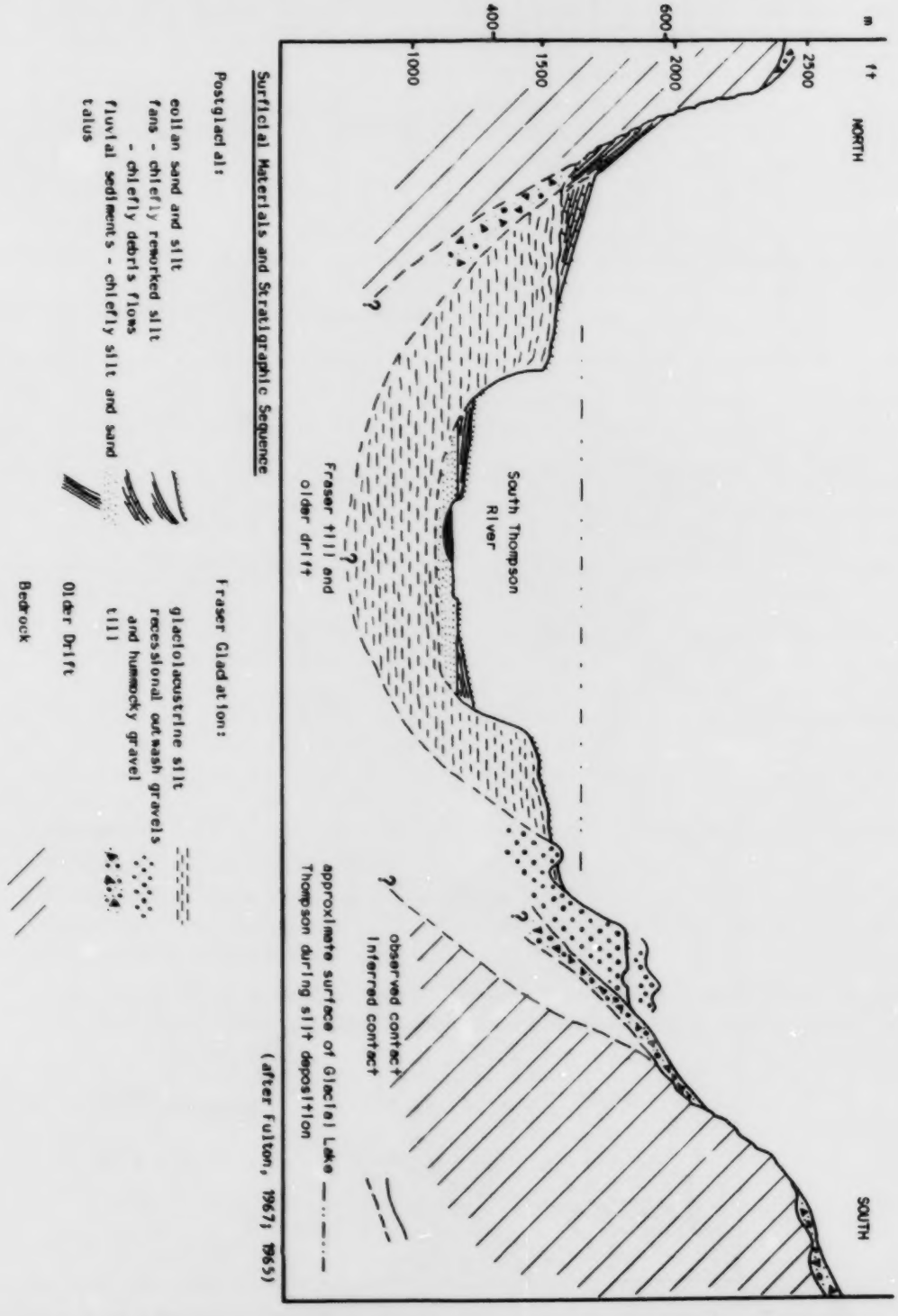


Figure 8. Schematic cross section of South Thompson River valley east of Kamloops.

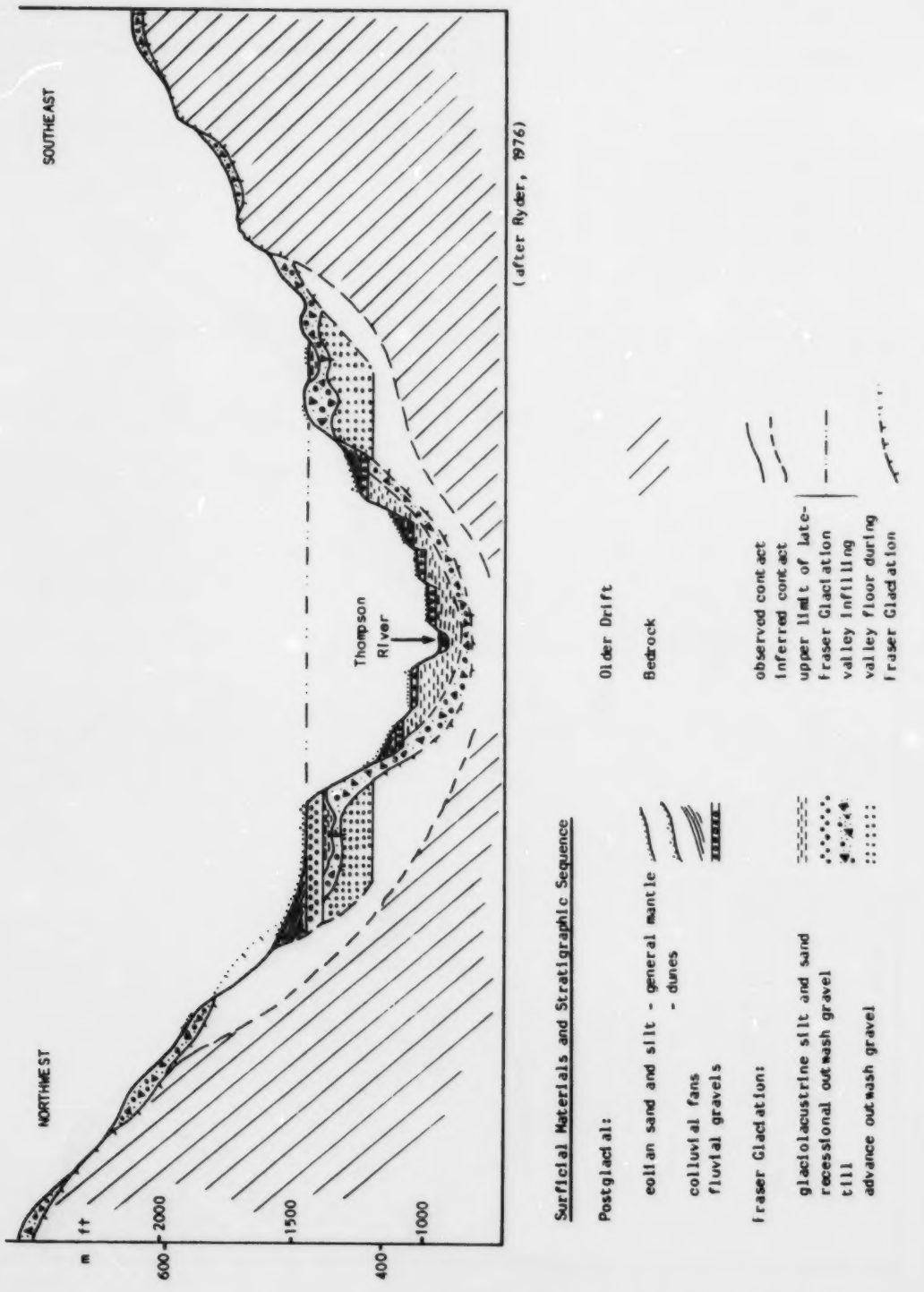


Figure 9. Schematic cross section of Thompson River valley at Ashcroft.

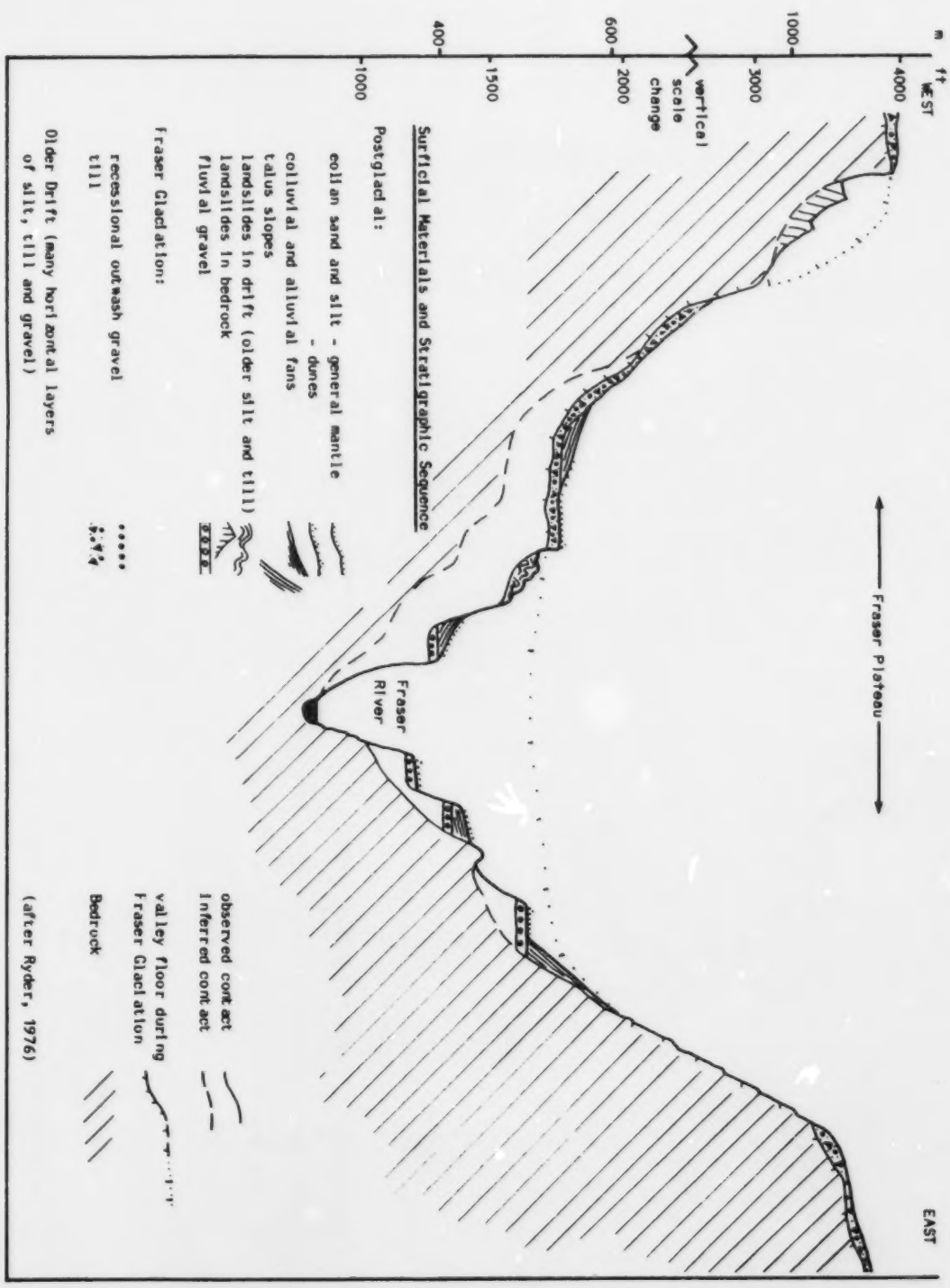


Figure 10. Schematic cross section of Fraser River valley near Pavilion.

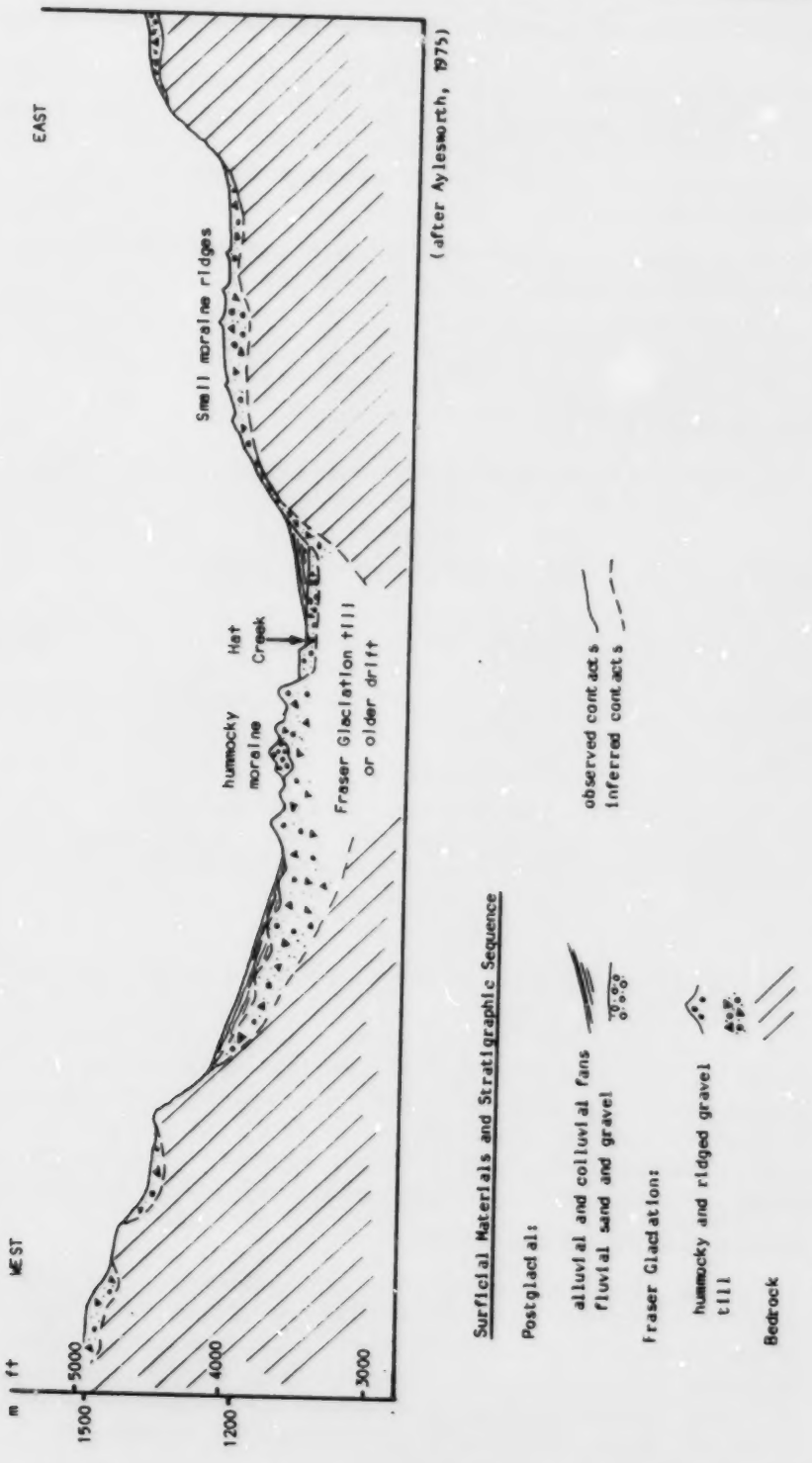


Figure 11. Schematic cross section of Hat Creek valley near Upper Hat Creek.

1.7.3 Distribution of Landforms within the Ashcroft Map Area

The surficial geology of the map area has been mapped at a scale of 1:125 000 by Fulton (1975) and Ryder (1976 and 1981). Surficial materials form the basis for the 1:100 000 scale soil/landform maps included with this report. Detailed mapping at a scale of 1:20 000 has also been carried out within the Stein River basin by Ryder (1981).

Figure 12 shows the general distribution of surficial materials in the map area. Definitions of the landforms are given in chapter 4.2.

1.8 Vegetation

Vegetation zones reflect broad climatic zones and have been used as a stratification level in defining soil associations. For example, a group of soil associations has been defined as occurring in the Interior bunchgrass zone while another group has been defined for the subzones of the Interior Douglas-fir zone (see Tables 12 and 13 in Chapter 4.7).

The biophysical forest regions, zones, and subzones used to stratify the soil landscape are based on criteria discussed by Walmsley and van Barneveld (1977). The biophysical zones and subzones are generally comparable to biogeoclimatic subzones developed by Krajina (1969) and modified by Mitchell and Green (1981) as shown in Table 3.

The vegetation zone map in Figure 13 is compiled from several sources: forest inventory data, the soil association maps accompanying this report, the biogeoclimatic maps of Krajina (1975), and Mitchell and Green (1981), and small scale maps showing grassland distribution by Tisdale (1947), and Watson and Van Ryswyk (1980).

Biophysical Forest (Vegetation) Zones are named after the kind of vegetation which grow and continuously reproduce in the zone if undisturbed and given enough time. This kind of vegetation is termed 'climatic climax' and is most suited to the climate within the zone. Many areas have been disturbed by fire or logging and some younger vegetation occupies these areas. These are seral vegetation types and within any biophysical vegetation zone they will gradually change until the climatic climax stage is reached, if no disturbance occurs. Figure 14 shows the vertical sequence of vegetation zones and the approximate elevational ranges.

Interior Bunchgrass Zone (IBG)

The Interior Bunchgrass Zone generally occurs at the lowest elevations, below 520 m (1700 ft) but extends up to 760 m (2500 ft) on some south aspects in the major valleys of the map area. Climax plant communities are dominated by bluebunch wheatgrass with lesser amounts of big sage, Sandberg's bluegrass and prairie koeleria. This zone is subject to droughty conditions and has approximately 120 to 150 mm of growing season precipitation, low snowfall, hot summers and a relatively long freeze-free period (Lea et al., 1985).

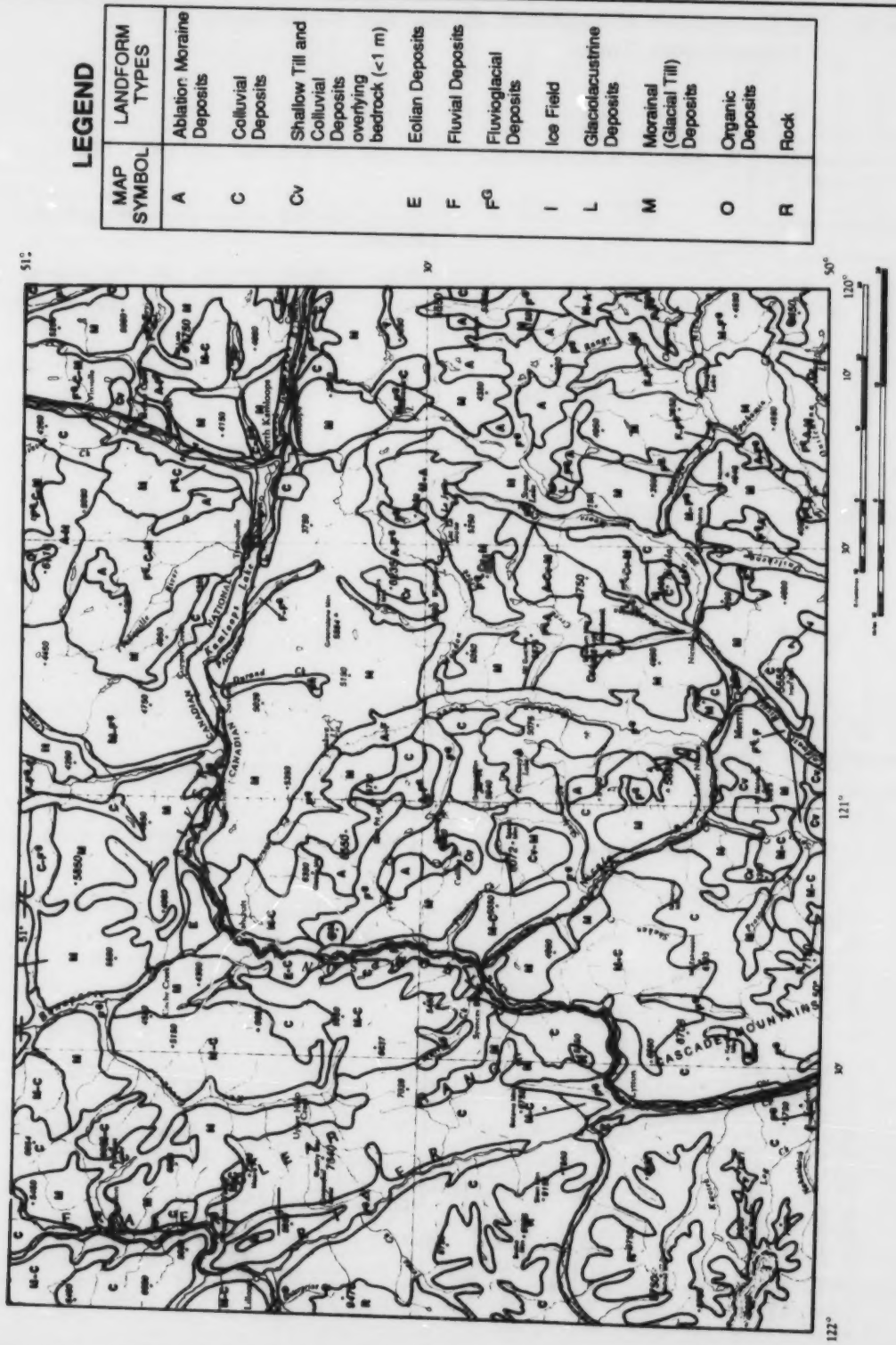


Figure 12. General distribution of surficial materials in the Ashcroft map area.

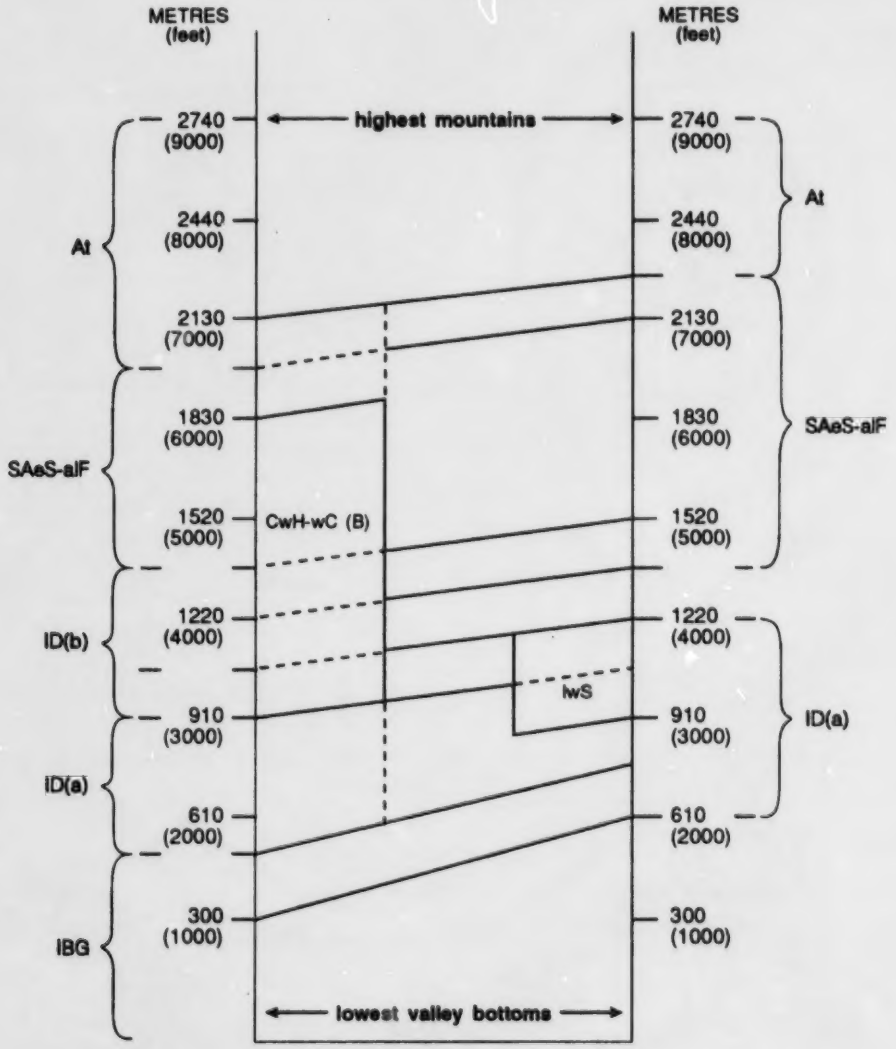
Table 3. A Comparison of Vegetation (Biophysical Forest) Zones and Biogeoclimatic Zones

Biophysical Forest Regions, Zones and Subzones (Van Barneveld and Harcombe, 1976; Walmsley and van Barneveld, 1977)	Biogeoclimatic Regions, Zones, and Subzones (Krajina, 1969; Mitchell and Green, 1981)
Dry Interior Region	**Cordilleran Cold Steppe and Savanna Forest Region**
IBG Interior Bunchgrass Zone	PPBG Ponderosa Pine – Bunchgrass Zone
ID Interior Douglas-fir Zone	PPBG(a) Very Dry Northern PPBG Grassland Subzone
ID(a) Interior Douglas-fir-Ponderosa Pine Subzone	1 – (Kamloops Grassland variant)
ID(b) Interior Douglas-fir-Lodgepole Pine Subzone	2 – (Douglas Lake Grassland variant)
IwS Interior White Spruce Zone	
SAeS-alF Subalpine Engelmann Spruce – Alpine Fir Zone	**Canadian Cordilleran Forest Region**
SAeS-alF (a) forested – Rocky Mountain Douglas-fir Subzone	IDF Interior Douglas-fir Zone
SAeS-alF (b) forested – Lodgepole Pine Subzone	IDF(a) Very Dry Submontane Subzone
SAeS-alF (c) Krummholz Subzone	IDF(b) Very Dry Montane Subzone
	IDF(c) Dry Submontane Subzone
Coastal-Interior Transition Region	IDF(d) Dry Western Montane Subzone
CwH-wC Coastal Western Hemlock – Western Red Cedar Zone	SBS Sub-boreal Spruce Zone
CwH-wC (b) Seral Douglas-fir Subzone	**Canadian Cordilleran Subalpine Forest Region**
AT Alpine Tundra Zone	MS Montane Spruce Zone
	MS(c) Very Dry Southern Subzone
	ESSF Engelmann Spruce-Subalpine Fir Zone
	Subzones d, e, f, pd, pe, pf
	IDF Interior Douglas-fir Zone
	IDF(d) Dry Western Montane Subzone
	IDF(e) Subcontinental Subzone
	Alpine Region
	AT Alpine Tundra Zone

Figure 13. Vegetation Zones of the Ashcroft Map Area.

Areas which produce low moisture stress for plants such as north aspects and/or moderately well to imperfectly drained, deep soils.

Areas which produce high moisture stress to plants such as south aspects and/or shallow soils and/or coarse textures with low moisture storage capacity



Note the lwS zone and CwH-wC(b) subzone are restricted to minor portions of the survey area. Also note the range of the CwH-wC(b) subzone from 460 to 2130 m (1500 to 7000 ft). (Refer to Figure 13 for definition of the zone and subzone symbols).

Figure 14. A general guide to biophysical forest zones and subzones in the Ashcroft map area.

The zone is most extensive around Ashcroft and Cache Creek but extends along the Thompson River from east and north of Kamloops and to south of Spences' Bridge. Another small portion occurs in the vicinity of Merritt and extends west to the lower Nicola area. Not all present day grasslands are in this zone (see section on grasslands which follows the description of biophysical forest zones).

Interior Douglas-fir Zone (ID)

Characteristics of this zone are also described by Tisdale and Maclean (1957). Rowe (1972) considered it as part of the montane forest region. This region has also been studied by Tisdale (1948) and Tisdale and Maclean (1957) and Lea *et al.* (1985).

The zone is characterized by climax communities on mesic sites that are dominated by Douglas-fir, with an understory dominated by bluebunch wheatgrass at lower elevations and soopolallie and pine grass at higher elevations. The zone has moderate moisture conditions (approximately 140 to 200 mm of growing season precipitation), moderate snowfall, warm summers and relatively long growing seasons. Presently, much of the zone is dominated at low elevations by open forests of ponderosa pine and bluebunch wheatgrass, or at higher elevations, closed forests of lodgepole pine, paper birch, trembling aspen, Douglas-fir, soopolallie and pine grass. The rate of succession is slow to moderate.

Interior Douglas-fir Zone: Ponderosa Pine Subzone (IDa)

This subzone is characterized by successional communities dominated by ponderosa pine with an understory of bluebunch wheatgrass. On drier sites such as those at lower elevations, on southern exposures and sites with shallow soils, the vegetation tends to be similar to the Interior Bunchgrass Zone. The soils are generally poorly developed (Brunisolic soils) due to limited precipitation. The rate of succession is relatively slow. The subzone is situated in an elevational band above the Interior Bunchgrass Zone and extends upward to elevations of between 920 to 1070 m (3000 to 3500 ft) on north aspects and 1070 to 1220 m (3500 to 4000 ft) on south aspects.

The subzone receives more precipitation and has higher biomass productivity than the Interior Bunchgrass Zone and has been studied and summarized by Brayshaw (1955, 1970). This subzone also contains extensive 'grasslands' which are discussed later in this section.

The Interior Douglas fir zone: Ponderosa Pine Subzone occurs in the major valleys of the Fraser and Thompson rivers, along the tributary Bonaparte, Deadman, and Nicola valleys, and occupies the valley floors of Hat, Guichon, and Quilchena creeks. The subzone also occupies some lower elevations between Merritt and Kamloops and around Douglas Lake.

Interior Douglas-fir Zone : Lodgepole Pine Subzone (IDb)

This subzone is characterized by having successional communities dominated by lodgepole pine with understories of soopolallie and pine grass. The subzone is subject to moderate precipitation and has warmer temperatures than the Interior White Spruce and Subalpine Engelmann spruce – Sub-alpine Fir zones. The soils frequently have clay-enriched subsurface horizons (Luvisolic soils) that may improve moisture and nutrient availability for plant growth. The rate of succession is moderate.

The Interior Douglas-fir Zone: Lodgepole Pine Subzone is the most extensive within the map area. It is situated elevationally above the ponderosa pine subzone but below the Subalpine Engelmann Spruce – Alpine Fir zone (SAeS-alF), Interior white Spruce Zone (IwS) and, in places, below the Coastal Western hemlock – western red cedar: seral rocky mountain Douglas-fir subzone (CwH-wC(b)). The ID(b) subzone is generally located between 1070 to 1520 m (3500 to 5000 ft) elevation on south aspects and between 920 to 1370 m (3000 to 4500 ft) on north aspects.

The subzone is most extensive on the Thompson Plateau with the largest expanses located south of Kamloops Lake, east of the Thompson River and north of Nicola River and Nicola Lake. In this area the boundary with the lower elevation ponderosa pine subzone is not always sharply defined as is the case north and south of Douglas and Chapperton lakes (see Figure 13). Other extensive areas of this subzone are located on the highlands between Bonaparte and Deadman rivers and east of the Deadman River and north of Kamloops Lake. The subzone also occurs in the Cascade Mountains south of Lytton and is extensive north of Lytton to Hat Creek and continuing further north. The subzone also forms a narrow elevational band on east and south aspects in the Coast Mountains west of the Fraser River.

Interior White Spruce Zone (IwS)

This zone is characterized by climax communities of either white or hybrid spruce with an understory of dwarf blueberry, northern twinflower and moss. Successional communities are dominated by lodgepole pine, soopolallie and pine grass. This zone is subjected to moderate precipitation and relatively cool temperatures. Soils are moderately leached (Luvisolic soils).

The Interior White Spruce Zone has limited distribution in the map area and only occurs on the Tranquille Plateau north of Kamloops where it is the southern extent of a much larger zone which lies along the western edge of the Interior Wet Belt. Interior white spruce is the climatic climax species and with either Rocky Mountain Douglas-fir or lodgepole pine as seral stages before climax. This zone is elevationally confined to a band between 920 to 1220 m (3000 to 4000 ft).

Coastal Western Hemlock – Western Red Cedar Zone; Seral Douglas-fir Subzone (CwH-wC(b))

This subzone is most extensive in the higher rainfall areas in the south-west corner of the map area, such as the Nahatlatch, Kwoiek, Stein and Mowhokam River valleys. Coastal western hemlock and western red cedar are the climatic climax species with Rocky Mountain Douglas-fir and lodgepole pine as seral stages. This subzone covers a wide range of elevations; on north aspects it lies between 460 and 1830 m (1500 and 6000 ft) and on south aspects between 1070 and 2130 m (3500 and 7000 ft). Extremely steep slopes, often with coarse textured, shallow to bedrock soils, seem to exaggerate the effects of aspect to produce the wide elevational ranges.

Subalpine Engelmann Spruce – Alpine Fir Zone; Forested Subzone (SAEs-alF)

This subzone is restricted to the higher elevation areas of the Ashcroft map area where Engelmann spruce and alpine fir form the climatic climax vegetation. The subzone is most extensive in the Coast Mountains west of the Fraser River, in the Cascade Mountains west of Hat Creek, and on the Tranquille Plateau north of Kamloops. Some higher elevation portions of the Thompson Plateau south of

Kamloops Lake are also within this zone. On the Thompson Plateau, the subzone generally lies above 1220 to 1520 m (4000 to 5000 ft) on north aspects and 1370 to 1670 m (4500 to 5500 ft) on south aspects. In the higher precipitation areas of the Coast and Cascade Mountains the subzone extends to much lower elevations, reaching as low as 760 m (2500 ft) on north aspects and 1070 m (3500 ft) on south aspects. Herring (1977) has studied advance alpine fir regeneration in this subzone.

Alpine Tundra Zone (At)

Alpine tundra areas are restricted to the highest elevations of the Coast and Cascade Mountains and the Fraser Plateau. These areas are not extensive and this zone was not used as a stratification to form new soil associations as most of the alpine areas consist of steep rock outcrops.

Grasslands

The Interior Bunchgrass zone (IBG) is considered the only true climatic climax grassland zone within the biophysical forest zone framework (van Barneveld, 1981 pers. comm.) while the biogeoclimatic zones of Krajina (1969) include the grasslands in the Ponderosa Pine – Bunchgrass Forest zone. Mitchell and Green (1981) recognize a grassland subzone of the Ponderosa Pine – Bunchgrass zone. In most forest zones, grasslands are considered seral to forest communities or occur in edaphic, topographic or topoedaphic climax situations and this tends to down-play their importance. The grasslands of the Ashcroft map area deserve some special mention, however, since they occupy the highest proportion of grassland within any map area of the province. (Fenger, 1982.)

Grasslands were utilized early in the history of the province and noted in early studies (Dawson, 1894; Whitford and Craig, 1918). The areal extent of the grasslands depends on the percentage of tree cover permitted, if any, within the definition of grassland that is used. The first major grassland study (Tisdale, 1947) included a sketch map showing their distribution in the province. A more recent map at a similar scale was compiled using satellite imagery (Watson and van Ryswyk, 1980). Forest cover maps (British Columbia Ministry of Forests, Inventory Division) differentiate between grassland and productive forest categories. Tisdale's and Watson and van Ryswyk's maps indicate more grasslands than the biogeoclimatic zonation maps of Mitchell and Green (1981). In the latter, grasslands are considered as edaphic, topoedaphic or disclimax phases within forested zones.

Using all vegetation information sources, the most extensive grasslands in the map area are those between Nicola and Douglas lakes. These extend north to Kamloops and along the North and South Thompson River Valleys. South of Spences Bridge the grasslands are somewhat confined within the Thompson and Nicola River valleys; this is also true of the grasslands along the Fraser River Valley. The valley bottoms of Hat and Guichon creeks also contain grasslands.

Many definitions and classifications of grasslands have been proposed. Tisdale (1947) recognized lower, middle and upper grassland zones. The lower zone, termed Bluebunch wheatgrass-sagebrush (*Agropyron – Artemisia*), has the least rainfall and lowest organic matter buildup in the surface soil horizon. The Bluebunch wheatgrass – bluegrass zone (*Agropyron – Poa*), the middle grassland zone, is slightly wetter and has more organic matter buildup while the Bunchgrass – Bluegrass (*Agropyron – Festuca*) or upper grassland zone receives the most moisture and has

the deepest buildup of organic matter in the surface soil horizons. These findings are verified by van Ryswyk *et al.*, (1965) in a study of differences between grasslands and grassland soils at various elevations. Van Ryswyk *et al.*, (1985), recognized similar grassland zones but used different species for naming each zone. For example, the lower zone is named *Artemisia*, the middle zone *Stipa – Poa*, and upper zone *Festuca*.

Table 4 shows the correlation between Tisdale (1947), van Ryswk *et al.*, (1966), the biophysical forest zones and subzones, and taxonomic soil development.

The grassland soil associations were mapped using a separate set of associations for each parent material in each biophysical forest zone. These zones coincide with the great group level of soil classification as shown in Table 4. Soil associations in each Chernozomic Great Group are shown in cross sectional diagrams (Figures 20, 21 and 22).

Table 4. Correlation of Vegetation Zones, Grasslands and Soil Development

Biophysical Forest Zone and Subzone	Grassland Classifications		Soil Development (CSSC, 1973) Great Group Level
	Tisdale (1947)	Van Ryswyck et al. (1965)	
IBG Interior Bunchgrass Zone	lower – (*Agropyron – Artemisia*)	lower – (*Artemisia*)	Brown Chernozem
ID(a) Interior Douglas-fir Zone: ponderosa pine subzone	middle – (*Agropyron – Poa*)	middle – (*Stipa – Poa*)	Dark Brown Chernozem
ID(b) Interior Douglas-fir Zone: lodgepole pine subzone	upper – (*Agropyron – Festuca*)	upper – (*Festuca*)	Black Chernozem

The Agriculture Canada Research Station at Kamloops has conducted several research studies dealing with the grasslands of the map area. To monitor the effects of grazing, exclosures have been installed. A *Handbook on Grazing Values of Range Plants of British Columbia* has been published by McLean, Smith and Pringle (1964) and descriptions of grassland ranges were summarized by McLean and Marchand (1968). McLean and Tisdale (1960) analyzed the chemical composition of native forage plants. McLean, Pringle and Willis (1961) addressed the problem of overgrazing and recommended seeding as a means of restoring productivity. Pringle and McLean (1962) issued a similar publication dealing with seeding forest ranges. McLean and Tisdale (1972) analyzed some of the data obtained from the grassland exclosures and estimated range recovery rates. Lord and McLean (1969) discuss aerial photo interpretation on British Columbia rangelands and Watson (1977) carried out a study of classification of the Lac du Bois range using remote sensing techniques. Parsons *et al.*, 1971, discusses soil properties affecting *Agropyron* communities at Kamloops. There are many more studies which focus on grasslands within the Ashcroft map area. The grasslands have also been the subject of several workshops and

publications dealing with interactions between cattle and wild ungulates and also relating to rangeland fertilization research (Kilcher *et al.*, 1965). A *Range Management Handbook for British Columbia* has been edited by McLean (1980). A summary of ecology and management of the grasslands and forested rangelands for the province has been compiled by Strang (1980) and contains many references and studies relevant to the Ashcroft map area. Nicholson, McLean and Baker (1982) produced a symposium on grassland classification for the British Columbia Ministry of Forests.

The *Forest-Grassland Ecotone* — a contribution by A. van Ryswyk, Research Station, Agriculture Canada, Kamloops.

A grassland transect on morainal and ablation moraine deposits along an elevational and climatic gradient between Kamloops and Lac du Bois indicates that the ratio of growing season precipitation to evapotranspiration increases gradually from the valley bottom at 350 m (1150 ft) elevation to about 800 m (2600 ft) elevation (van Ryswyk *et al.*, 1965). Above this elevation, this ratio increased more rapidly towards the edge of the treeline at 945 m (3100 ft) elevation. The change in soil organic carbon along this transect closely parallels the ratio of growing season precipitation to evapotranspiration (Green and van Ryswyk, 1982). It is quite likely that the upper 150 m (500 ft) of elevation along this studied grassland transect represents the lower portion of a broad forest-grassland ecotone zone in which forest or grassland edaphic or topo-edaphic vegetation variants to should be expected to occur. Indeed, the higher elevation portion of this transect is associated with Dark Brown to Black Chernozemic soils supporting dense herbaceous vegetation (*Agropyron-Festuca*) that would be quite capable of carrying periodic fires which would kill young tree seedlings. Black Chernozemic soils on the Great Plains are considered to have been maintained in large part by fire (Dormaar and Lutwick, 1966; Pettapiece, 1969). (It may be argued whether fire is a climatic factor or one, like non-modal soils and/or topography, and grazing, that produces a variant vegetation.)

About 10 km west of this transect, Lea et al., (1985) describes vegetation of the Interior Bunchgrass Zone extending up to about 750 m (2200 ft) (well below the break in the PE curve of the precipitation:evaporation ratio for the Lac du Bois transect) on south facing slopes, with morainal material and Brown Chernozemic soil development. Lea *et al.*, 1985 describes the vegetation of the Interior Rocky Mountain Douglas-fir Zone:ponderosa pine subzone immediately above this ecotone zone on skeletal colluvial materials with a moisture regime that allows establishment and survival of ponderosa pine and Rocky Mountain Douglas-fir. The herbaceous vegetation (*Artemisia-Agropyron*) of the adjacent Brown Chernozems is less dense than that of the Black Chernozems and probably less susceptible to fire, so that fire frequency was low enough to allow the pine and fir to reach fire resistant ages on the forested landscape (Brayshaw, 1970). In this instance, the grassland-forest boundary would not be fire-maintained but rather due to edaphic differences. This might indicate that the grassland-forest ecotone covers about 300 m (1000 ft) elevation or more, not unreasonable when the comparable ecotone (parkland) on the Prairies averages a distance of about 300 km (180 mi) (Pettapiece, 1969).

An extreme example of an edaphic grassland variant exists in the Kamloops area where small areas of grassland vegetation occur at high (1500 m) elevation on steep, south facing slopes with shallow soils in the vicinity of Greenstone Mountain. These 'outliers' may be the remnants of a continuous grassland that existed during

the very warm and dry interval 10,000 to 8,000 B.P. when grassland-forest boundaries were much higher than at present (Hebda, 1982). Further evidence that vegetation zones were much higher during that period exist in the Princeton map area in the Alpine Tundra Zone. Podzolic Bf horizons were formed in remnant surface volcanic ash material in lee positions up to 2650 m (8600 ft) elevation on Lakeview Mt. This indicates that at least ericaceous shrub vegetation and possibly coniferous trees had reached that elevation, 490 m (1600 ft) above their present location at 2150 m (7000 ft) (van Ryswyk and Okazaki, 1979). A 9100 year old piece of charcoal was found buried at 0.75 m in a buried Ah horizon of a Cumulic Regosol at 2460 m (8000 ft) on the same mountain, indicating tree vegetation existed at this site before 9100 B.P. (van Ryswyk, 1971).

On the other extreme, ponderosa pine communities exist at low elevations in the Interior Bunchgrass Zone on deep, coarse textured materials that have available water at some depth.

1.9 Agriculture

Ranching is the most common agricultural enterprise in the map area and makes widespread use of the extensive grasslands. Weir (1955) contains a good summary of ranching on the Southern Interior Plateau. A more recent synopsis of ranching in the province by the Ministry of Forests (1980) outlines the Kamloops Region's range resources. Chapter Five (section 5.1) outlines grazing capability ratings for the soil associations described in this report.

The B.C. Land Inventory provided agricultural land capability ratings using the soil maps as a base. These agricultural capability maps are at a scale of 1:50 000 and formed the basis of the Agricultural Land Reserves in the Ashcroft map area. The main limiting factor to unimproved or non-irrigated agricultural capability is climatic aridity and the lack of soil moisture during the growing season for lower elevation areas. Class 6 is the usual rating for the Thompson Valley and Class 5 for the Fraser Valley between Lytton and Lillooet. Unimproved ratings of classes 4 and 5 are more widespread in the eastern half of the map area and generally coincide with the distribution of the mid-and-upper grasslands of the Thompson Plateau where moisture deficiencies are less limiting.

Improved agricultural capability can be achieved mainly through irrigation, and substantial changes in ratings often result. The improved and unimproved agriculture capability ratings for each soil association are given in Chapter Five (section 5.1).

Figure 15 shows the generalized improved agriculture capability ratings for the soils of the Ashcroft map area. This map has been derived from 1:50 000 scale agricultural capability maps available from the same source as this publication. It is interesting to compare Figure 5 – Climate Capability for Agriculture and Figure 15 – General Soil Capability of Agriculture. Only a fraction of the area shown as Class 1 climate capability have soils without some limitation to agriculture. More detailed description of the capability classes is contained in Chapter Five (section 5.1) of this report. Ratings are based on agriculture capability classifications summarized by Runka (1973) and more recently by Kenk (1983).

Figure 15. Generalized improved agriculture capability ratings in the Ashcroft map area.

1.10 Forestry

The dominant land capability for forestry ratings throughout most of the forested uplands of the Thompson Plateau range from Class 3 to Class 5. A definition of classes and the range of productivity is contained in Chapter Five. The forest-grassland transition areas are rated Class 6, while the grasslands are Class 7. The main limiting factor for forest production is climatic aridity, which causes soil moisture deficiencies.

The higher precipitation locations west of the Fraser River have some valley bottoms which are rated Class 1 and lower valley slopes rated Class 3; however these are somewhat restricted in area. The main limitations to forest growth in the Coast Mountains are shallow to bedrock soils, climatic exposure, and short growing seasons at the higher elevations. Generalized forestry capability classes and limitations for each soil association are given in Chapter Five.

Land capability for forestry maps, are available at a scale of 1:50 000 from MAPS-B.C., Survey and Resource Mapping Branch, British Columbia Ministry of Crown Lands.

1.11 Wildlife and Waterfowl

The Canada Land Inventory (1970) classified the Ashcroft map area for its capability to produce wild ungulates. Five species of large ungulates are resident in the map area. Mule deer are abundant throughout the area in the summer, with wintering areas restricted to locations at low elevations such as along the Thompson and Nicola rivers. Moose occur in limited numbers, mostly in the eastern half of the map area. Mountain goats are common only in the Coast Mountains and winter on the rocky, south-facing slopes. Rocky Mountain bighorn sheep, introduced in the vicinity of Spences Bridge in 1928, still maintain a moderate population.

California bighorn sheep, which were introduced along the north shore of Kamloops Lake in 1966, have expanded their population slightly. Black bear and cougar are common throughout, while grizzly bear mainly occur west of the Fraser River.

There have been a number of studies and workshops dealing with ungulates. A workshop (Miltimore, 1972) dealt with interactions between cattle and ungulates. Willms *et al.* (1979) studied mule deer and cattle interactions on big sagebrush ranges near Kamloops. The feeding habits of mule deer with changing snow depth are summarized by Willms, McLean, and Ritcey (1976). Willms and McLean (1978) also studied feeding habitats of tame mule deer near Kamloops. Willms *et al.* (1980) reported on the effects of burning on forage selection by cattle and deer.

Canada Land Inventory (1969) also rated the map area for its capability to produce waterfowl. Their findings indicate some of the best waterfowl producing areas are the lakes in open grassland areas, such as Minnie, Douglas, Nicola, and Chapperon. The Upper Hat Creek Valley, Bachelor Range area, and the vicinity of Knutsford are also important waterfowl producers. Nesting is the main use; the most common species are mallards, pintails, blue winged teal, scaup and goldeneye.

1.12 Fisheries

Great Lakes char are found in the larger deep lakes of the valleys, Dolly Varden char are abundant in most streams, and kokanee are resident in Nicola Lake. Four species of salmon migrate up the Fraser and Thompson river systems to spawn. Kamloops trout are common; studies on this species are summarized by Raymond (1980).

1.13 Recreation

The Canada Land Inventory (1971) produced a recreation capability map for the Ashcroft map area. It indicates the land's suitability for a wide range of recreational opportunities.

Although warm water temperatures and fine gravel beaches are common on Nicola and Kamloops Lakes, family beach activities are usually restricted to smaller lakes such as Paul Lake, due to unpredictable, strong winds on the larger water bodies. Fishing is a common activity on many of the smaller lakes with some reserved for fly fishing only. There are opportunities for steelhead fishing and viewing migrating salmon along the Fraser, Thompson and Nicola rivers. Traditional native fishing methods can be observed near Bridge River, while spawning salmon may be viewed in the artificially created spawning beds near Lillooet. The opportunity for hunting or viewing of ungulates, waterfowl, and game birds is available through most of the map area.

The dry, desert-like conditions along the Thompson Valley together with its natural scenic beauty makes hiking, horseback riding, and river travel enjoyable. The outstanding scenery along the Fraser Canyon and its many tributaries provides pleasant places for camping. The map area is rich in historic artifacts, and towns such as Ashcroft and Lillooet contain old buildings and much of the lore of the gold rush days.

The cold winter temperatures provide opportunities for cross country and downhill skiing, snowshoeing and skidooing in the higher snowfall areas in the northeast and southwestern portions of the map area.

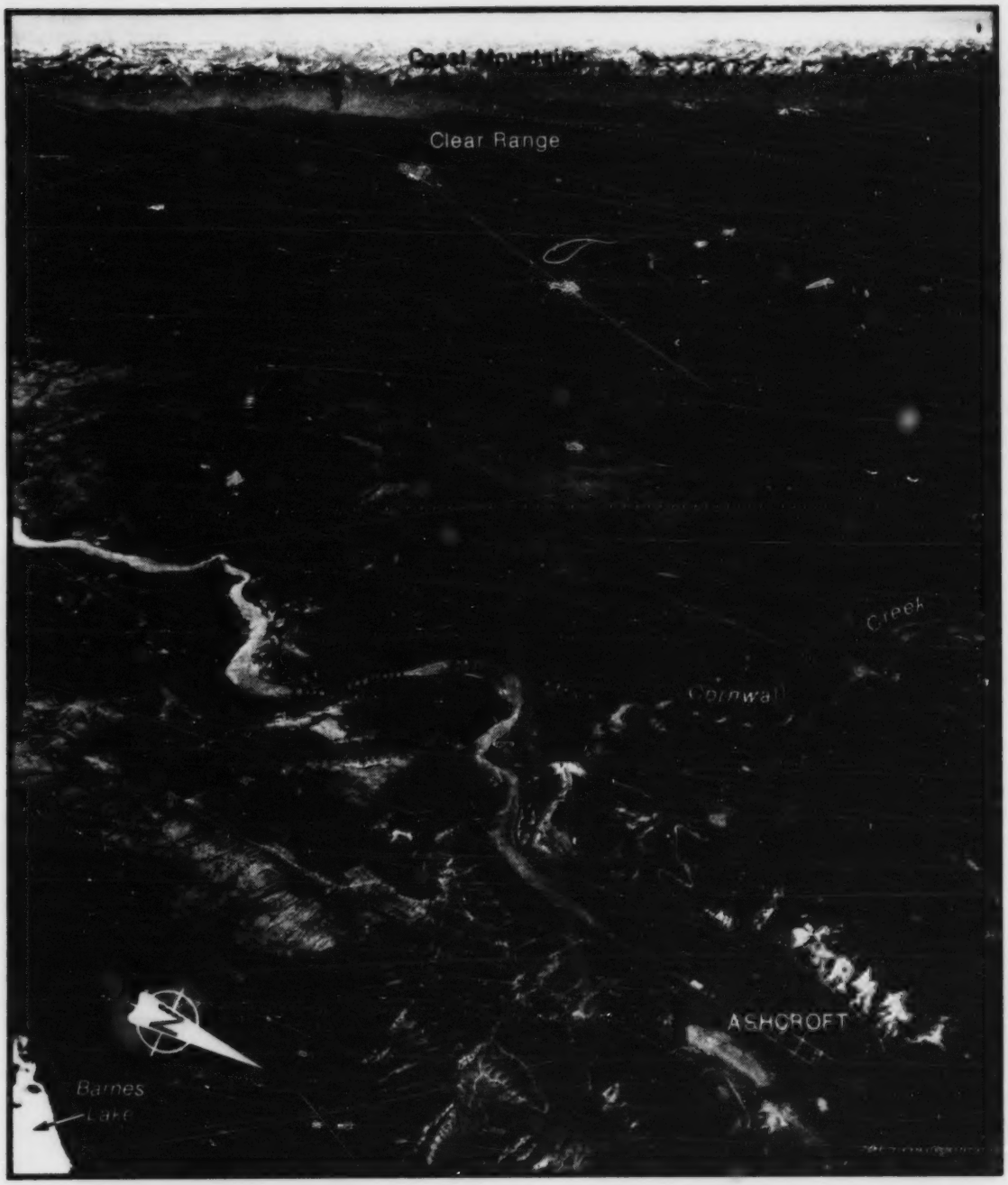


Plate 2: Ashcroft to Hat Creek

Note the gullies formed in the morainal deposits near Ashcroft. The soils developed on less steep, morainal materials in the foreground are in the Interior Bunchgrass zone and belong to the Tranquille and McKnight soil associations; Brown Chernozems are the most common soils. The grasslands near Upper Hat Creek are within the Interior Douglas-fir forest zone; ponderosa pine subzone. This zone receives more precipitation than the area near Ashcroft and the soils are Calcareous Black Chernozems characteristic of the Medicine association. The Douglas-fir and ponderosa pine forests between the two grassland areas are on medium textured Gray Luvisols typical of the McLaren association. In the Clear Range, the parent material is primarily colluvium. Soil development is either Dystric or Eutric Brunisol depending on the reaction of parent material and the degree of weathering. The soils in the Coast Mountains receive the most precipitation and Humo-Ferric Podzol is the usual soil development. B.C. Photo 653:63.

Chapter 2

Soil Survey, Mapping Procedures and Mapping Philosophy

2.1 Mapping Procedures

Prior to the field work, preliminary assessment of the terrain and access was undertaken on 1:70 000 scale aerial photographs and 1:50 000 and 1:250 000 National Topographic Series maps. A review of available information on soil, climate, bedrock, surficial geology, and vegetation was also conducted. Boundaries between contrasting landforms and soils were drawn on the aerial photographs using visible landscape features such as vegetation, slope, form and shape of deposits, and photograph tone, texture, and pattern. Field work involved verifying the previously defined map unit boundaries and describing the soil, vegetation and the landform characteristics within the boundaries.

Field work consisted of gathering soil and related data along all passable roads. Pretyped map units, boundaries, and symbols were adjusted as necessary. From the gathered information the soil association legend was developed and as new or different soils were encountered they were either placed within the existing soil legend framework or, if sufficiently extensive and different, a new association was defined. To assist in classification, samples from diagnostic soil horizons were taken for laboratory analysis. The soils were classified according to the system of Soil Classification for Canada (Canadian Soil Survey Committee, 1973).

The main soil characteristics of the profiles, such as colour (according to the Munsell notation), horizon sequences, structure, texture, presence/absence of mottles, were recorded. Characteristics of the total physiographic environment were also recorded, such as drainage, stoniness, parent material, topography, aspect, vegetation, and climate. Representative soil samples of most soil associations were collected and analysed in the laboratory and detailed soil profile descriptions recorded. Forest plots were located on most soil associations and mensurational data recorded.

Eventually the soils were given names from the areas where they were first found, plus symbols to denote the names. At the end of the field season typical profiles representative of the major soil associations were described and sampled in detail. Soil boundaries were transferred from the aerial photographs to 1: 50 000 scale topographic maps. These maps, combined and printed at 1:100 000 scale are included with this report.

2.2 Reliability

Mapping reliability depends partially on accessibility and to some extent on landscape complexity. Accessibility was fair to good in the valleys, particularly those at mid-to-lower elevations. There are, however, significant areas, mainly at the higher elevations in the western half of the map area, where access was poor or non-existent and mapping was mainly by aerial photo interpretation and extrapolation.

Reliability is therefore somewhat dependent upon access and all map units have not been field checked. Any map unit symbol will not describe 100% of what is in that polygon. Polygons in which there is a dense road network are expected to be 85% reliable, areas with sparse road network, 75% reliable, and areas with no access, 65% reliable (Valentine and Schori, 1980).

2.3 Map Units

The landform map units form the basis for the soil association map units; landform and soil association boundaries and units are the same.

A soil association consists of a group of soils that have developed on similar parent materials and under similar climatic conditions. The vegetation zone provides an indirect indication of climatic conditions. The linkages between vegetation zone and the inferred climate and the parent materials and drainage as expressed by the soil association form a sound basis for land use planning. The synthesis of a soil association is depicted in Figure 16 (Kowall, 1980).

The dominant soil of a soil association generally consists of one or sometimes two related soil subgroups of one soil great group.

The soil associations are indicated on the map by a two letter symbol, for example, GS, and the association components are indicated by numbers, for example, GS1, GS2. Each soil association component contains a dominant (most common) soil which has been classified to the subgroup level in the 1973 Canadian System of Soil Classification. This most common soil occupies 40 to 100% of the delineated polygon. A second (less common) soil occupying between 20 to 40% of the map unit is also indicated. Soils occupying less than 10% of a mapping unit are normally not identified. Component numbers change when the characteristics of the less common soil change. See Table 7a for definitions of soil components.

Combinations of two or more soil association components are mapped when they occur in a pattern too intermixed to delineate at the scale of mapping. The percentage of the map unit occupied by each soil association component is indicated by superscripts. Thus, a delineated area designated as $MG4^{6}$ – $GD^{4}2$ contains about 60% of the McKnight soil association (component 4) and about 40% of the Godey soil association (component 2).

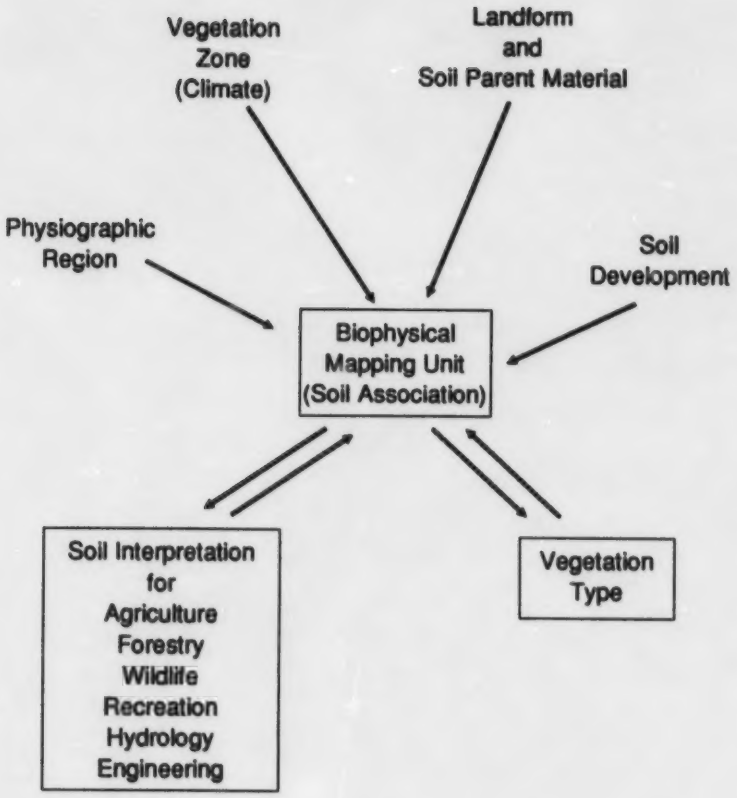


Figure 16. Synthesis of a biophysical mapping unit (Kowall, 1980).

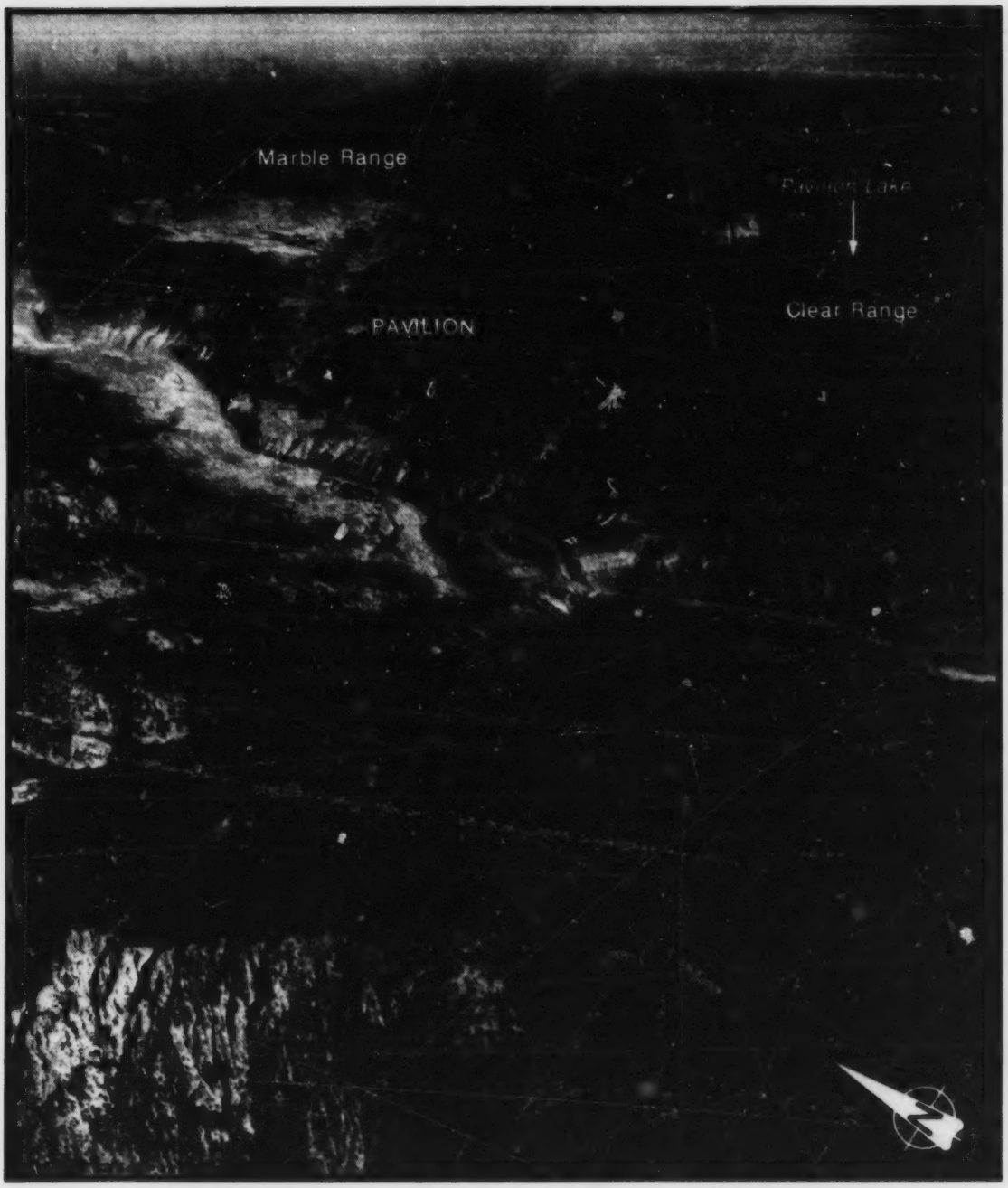


Plate 3: Bridge River towards Pavilion Lake

The steep area in the foreground is mapped primarily as Rock Outcrop interspersed with some coarse colluvial soils having Eutric Brunisol development (Chasm association). The Douglas-fir and ponderosa pine forests at the top of slope in the foreground are on shallow Brunisolic soils of the Cairn Mountain and Chasm associations. The soils in the Interior Bunchgrass zone along the Fraser River are developed on coarse textured, rapidly drained fluvioglacial materials of the Godey association and have Brown Chernozem profiles. The grasslands above the B.C. Railway are within the Douglas-fir forest zone, receive more precipitation and have Black Chernozem profiles typical of the Tullee association. B.C. Photo 566:84.

Chapter Three

A General Summary of the Soils of the Ashcroft Map Area

3.1 Factors Affecting Soil Development within the Map Area

This chapter gives an overview of the types of soil found in the Ashcroft map area. Soil developments and the environmental factors causing them are outlined with emphasis on trends and relationships. The general characteristics of the main soil orders are discussed and the relative landscape positions of the soil associations are diagrammatically presented.

Soil is a product of five soil forming factors (Jenny, 1941, 1980). These are parent materials (bedrock types and/or surficial materials), topography, climate, organisms and time. Tables 12 and 13 in Chapter 4.7 show the general framework for defining soil associations in the Fraser Plateau, Thompson Plateau, Shuswap Highlands, and Coast Mountain physiographic regions.

In the study area there is a general trend of increasing precipitation and decreasing evapotranspiration with increasing elevation. This trend influences the types of vegetation, the degree of weathering and soil development as shown by the schematic cross section in Figure 17.

The general relationship between soil developments as expressed by taxonomic great groups in the study area is shown in Figure 18. It illustrates how the generalized soil profile developments of the various soil subgroups change with increasing elevation and/or moisture.

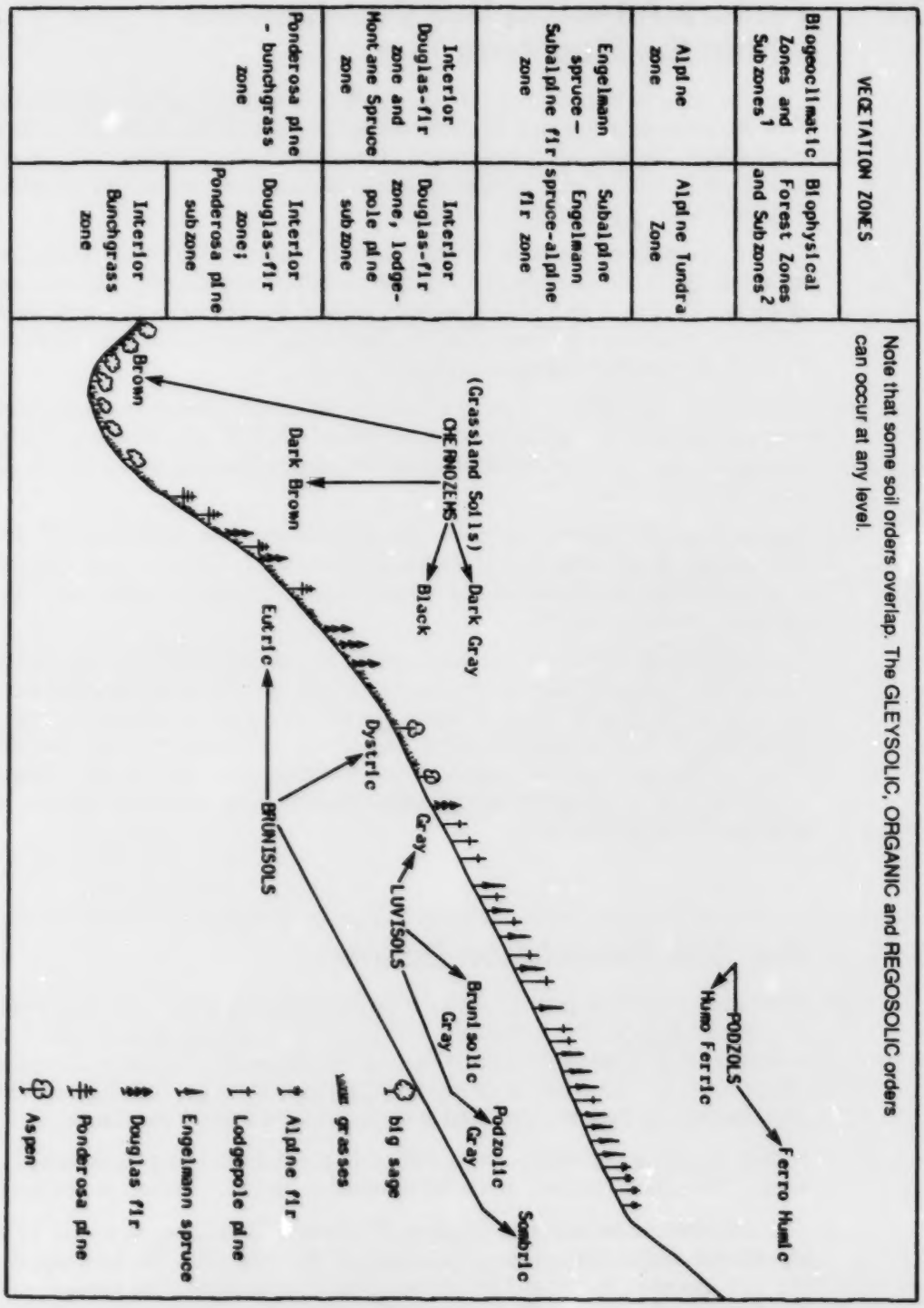
The general distribution of soil great groups in the map area is shown by Figure 19. Subgroups within the Chernozemic great soil group have been differentiated. A soil great group is a subdivision of a soil order within the Canadian System of Soil Classification. Soil orders are differentiated on soil characteristics that reflect the nature of the soil and the dominant soil-forming processes. A soil subgroup is a subdivision of a soil great group with differentiating criteria based on kind and arrangement of soil horizons.

3.2 The Soil Association Defined

A soil association is a group of soils developed on similar parent materials under similar climatic conditions. The interaction between parent material and climate results in a modal or most commonly occurring soil development. Variation from the modal component can occur due to changes soil texture, drainage, soil depth, vegetation or other factors and these are identified as components of the soil association.

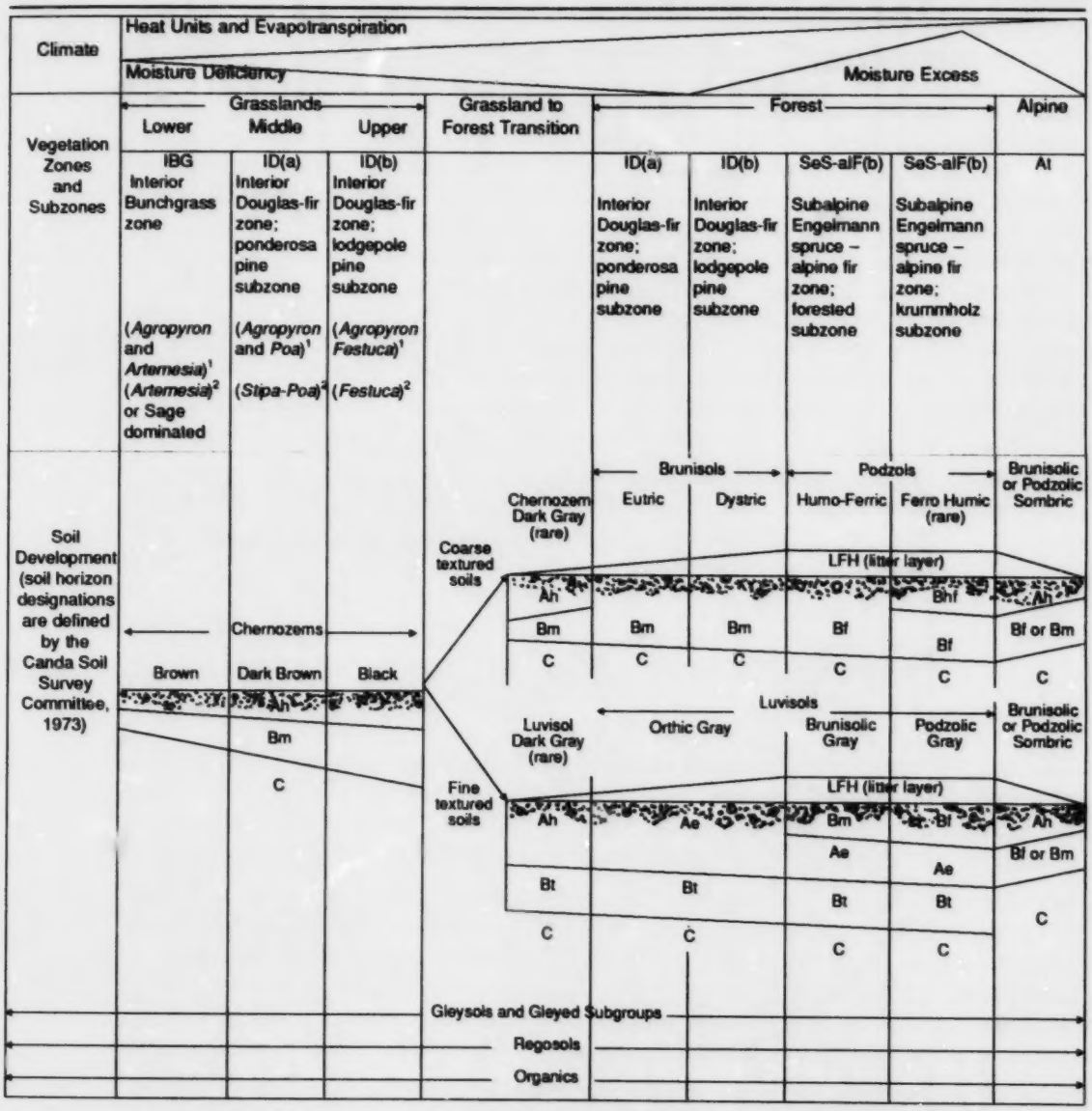
Ninety-six soil associations are identified in the Ashcroft map area. About 40 recur widely throughout the area while the remainder are fairly limited in occurrence.

The schematic cross sections (Figures 20 through 27) portray segments of the main elevational and/or precipitation gradients in the map area. To facilitate discussion the soil associations have been generalized into groups with similar soil profile development at the Great Group level. The most commonly occuring soil development (at the soil subgroup level) is indicated by abreviations in parentheses below each association name.



[1] After Krajina, 1969 and Mitchell and Green, 1981
[2] After van Barneveld, 1976

Figure 17. Schematic diagram of general trends in soil great groups with increasing elevation and/or precipitation in the Ashcroft map area.



This table is only meant to show some of the general trends in soil development within the map area. Many of the subgroups indicated within the vegetation zones and subzones are not the most commonly occuring subgroups; for example, Dystric Brunisols occur widely in the Subalpine Englemann spruce– alpine fir zone. It should also be noted that both Dark Gray Luvisols and Dark Gray Chenozems are rare and the forest to grassland transition is usually abrupt to either Eutric or Dystric Brunisols or Gray Luvisols.

[1] Name of grassland after Tisdale, 1947.
[2] Name of grassland afdter van Ryswyk *et al.*, 1965.

Figure 18. Soil profile development and soil great group trends within the Ashcroft map area.

Figure 19. Generalized distribution of soil great groups and chernozemic subgroups in the Ashcroft map area.

3.3 Soils of the Grassland Areas; the Chernozems

Soils formed under grasslands are usually classified as Chernozemic soils or within the Chernozem soil order. Chernozem means "dark surface layer". Organic matter accumulates in the surface due to the production and decomposition of the many roots developed by grass vegetation. The amount of organic matter accumulation determines the colour of the surface; as a general rule, the higher the organic matter content, the darker the colour. The colour of the surface layer determines the subdivisions within the Chernozem Order and within the map area, Brown Chernozems occur at the low elevations, Dark Brown Chernozems at mid-elevations and Black or Dark Gray Chernozems at the higher elevations. Chernozems are usually quite fertile since the organic matter accumulation replaces soluble nutrients lost by leaching. Table 5 identifies the soil associations in the map area that are classified in the various Great Groups of the Chernozemic soil order.

The relationships between soil associations which are dominantly Brown Chernozems are shown in Figure 20. The relationships between Dark Brown Chernozems and Black Chernozems are respectively depicted in Figures 21 and 22.

3.4 Soils of the Lower Elevation Forested Areas; the Brunisols

Brunisols are the most extensive soils in the map area. They have surface horizons which are moderately weathered and leached. These horizons are usually light brown to brown in colour with depths dependent upon the degree of leaching. Generally the zone of leaching is thickest in areas receiving the highest amounts of precipitation.

The Brunisolic soil order contains two main Great Groups: Dystric Brunisols and Eutric Brunisols. Eutric Brunisols are the most extensive in the map area, are neutral to basic in soil reaction and generally occur in areas of relatively low precipitation. They also usually contain more available plant nutrients than the strongly weathered, acidic Dystric Brunisols. Figures 23 and 24 provide schematic cross-sections of the relationships between soil associations having Brunisolic soil development.

Dystric Brunisols usually occur at moist, higher elevation locations or in areas where the soil parent materials are acidic. In the map area these are mainly situated in the Coast Mountains (Scuzzy Pluton) and on portions of the Thompson Plateau such as the Guichon Batholith. Figure 24 provides a cross-section showing the relationships between Dystric, Melanic, and Sombric Brunisol soil developments.

3.5 Soils of the Mid-Elevation Forested Areas; the Luvisols

Soils with Luvisolic profile developments are fairly extensive on the Thompson Plateau. Luvisolic soils have light-coloured, acidic surface horizons from which clays have been leached downward. The clay accumulates in the subsurface to form a clay enriched layer which distinguishes the Luvisolic soils. With increased precipitation the leached surface horizon becomes more strongly weathered and assumes colours and characteristics similar to the upper horizons of the Brunisolic soils.

Figure 25 shows the relationships between soil associations with dominantly Luvisolic soil development.

Table 5. Great Soil Groups and Associations of the Grassland Areas

Soil Great Groups (Subdivisions of the Chernozemic Soil Order)	Trends	General Elevation Range m (ft)	Biophysical Forest Zone	Soil Associations (See cross sectional diagrams, Figures 20 to 22)
Brown Chernozem (Figure 20)	Increasing precipitation and/or elevation	below 760 m (2500 ft)	Interior Bunchgrass Zone	Carabine, Cache Creek, Courtney, Flat Creek, Godey, Lundbom, Tranquille, McKnight, Shumay, Scuitto
Dark Brown Chernozem (Figure 21)		between 300 and 1220 m (1000 and 4000 ft)	Interior Douglas-fir Zone; ponderosa pine subzone	Commonage, Glimpse, Lac du Bois, Laluwissen, McQueen, Trapp Lake, Soues
Black Chernozem (Figure 22)		between 900 and 1520 m (3000 and 5000 ft)	Interior Douglas-fir Zone; lodgepole pine subzone	Alymer, Gwenn*, Meander, Mossey*, Medicine, Tullee*, Trachyte
Dark Gray Chernozem (dominates in no soil association)		between 900 and 1520 m (3000 and 5000 ft)	Interior Douglas-fir Zone; lodgepole pine subzone	occurs only as a secondary component of other soil associations

*Soil association can occur in both subzones of the Interior Douglas-fir Zone.

3.6 Soils of the High Elevation Forested Areas; the Podzols

Podzolic soils have developed at higher elevations where precipitation is highest and weathering and leaching is most intense. These forested soils have relatively thick surface litter layers since cooler temperatures have slowed the decomposition of the organic material. Strong weathering has released amorphous iron and aluminum to produce the distinctive reddish horizons of Podzols. A thin, gray, strongly leached horizon often occurs at the soil surface. Due to relatively strong leaching, Podzolic soils tend to be the somewhat infertile. Figure 26 indicates the relationship between soil associations with dominantly Podzolic soil development.

3.7 Soils of the Floodplains and Poorly Drained Areas; the Regosols, Gleysols and Organics

Regosols, Gleysols and Organic soils do not conform to the general elevational and/or precipitation trends which have been discussed for Chernozems, Brunisols, Luvisols and Podzols. Since Regosolic soils are relatively young, little weathering or leaching has taken place and the soils are most similar to the original parent materials. Gleysols are mineral soils which have formed in areas with poor and very poor drainage, while Organics are also poorly drained and occur in areas where the rate of deposition of organic matter is less than the accumulation. Figure 27 provides the relationship between the Regosolic, Gleysolic and Organic soil associations.

Differences between soil associations on the same type of parent materials.		Carabine CB (O.B)	Cache Creek CC (R.B)	Courtney CT (O.B)	McKnight MG (O.B)	Tranquille TQ (O.B)	Lundbom LM (O.B)	Flat Creek FT (O.B)	Scuitto ST (O.B)	Shumway SM (O.B)	Godey GD (O.B)
Elevation as indicated by forest zone	Biophysical Forest Zone										
	Interior Douglas-fir Zone; ponderosa pine subzone										
	Interior Bunchgrass Zone										
			Colluvial Fan		Moraine		Lacustrine	Fluvial	Fluvioglacial		
	Bedrock Characteristics	basic and calcareous	basic and calcareous	basic	basic and calcareous	basic	variable	variable	variable	variable	variable
	Other Characteristics							sandy to sandy loam	sand loam to silt loam	sandy loam to loamy sand	sandy loam to silt loam

Figure 20. Brown Chernozem soil associations.

Elevation as indicated by forest zones		Soues SO (O.B)	Commonage CO (O.DB)	McQueen MQ (O.DB)	Trapp Lake TP (O.DB)	Lac du Bois LD (SZ.DB)	Laluwissen LS (O.DB)	Glimpse GS (O.DB)
	Biophysical Forest Zones							
	Interior Douglas-fir zone; lodgepole pine subzone							
	Interior Douglas-fir zone; ponderosa pine subzone							
		Colluvium	Colluvial Fan	Moraine		Lacustrine		Fluvioglacial
Differences between soil associations within the same forest zone or subzone and developed on the same type of materials	Bedrock Characteristics	calcareous	basic	acid	basic	variable	variable	variable
	Other Characteristics					alkaline salts in the soil profile		

Figure 21. Dark Brown Chernozem soil associations.

Differences between soil associations within the same forest zone or subzone and developed on the same type of materials.	Bedrock Characteristics	Biophysical Forest Zone	Trachyte TH (O.BL)	Meander MA (O.BL)	Mossey MD (O.BL)	Tullee TE (O.BL)	Gwenn GW (O.BL)	Alymer AY (O.BL)	Medicine MC (CA.BL)
Elevation as indicated by forest zones		Interior Douglas-fir zone; lodgepole pine subzone							
		Interior Douglas-fir zone; lodgepole and ponderosa pine subzones							
		Interior Douglas-fir zone; ponderosa pine subzone							
			Moraine or Till				Fluvioglacial	Abalation Moraine	Moraine
	basic		basic	basic volcanics and limestone	basic and calcareous	basic	variable	basic and calcareous	basic and calcareous

Figure 22. Black Chernozem soil associations.

Differences between soil associations within the same forest zone or subzone and developed on the same type of materials	Biophysical Forest Zones	Hotfish HH (D.EB)	Timber TM (D.EB)	Gisborne GN (D.EB)	Holden HD (D.EB)	Dunlevy D (D.EB)	Struthers SE (D.EB)	Andrew AD (D.EB)	Izman Creek IZ (D.EB)	Glossey GY (D.EB)	Succour SR (D.EB)
Elevation as indicated by forest zones	Interior White Spruce zone										
	Interior Douglas-fir zone; lodgepole pine subzone										
	Interior Douglas-fir zone; ponderosa pine subzone										
	Bedrock characteristics	basic	basic	mainly volcanic	mainly limestone	variable	variable	basic and calcareous	mainly granitic	mainly volcanic	variable
	Other characteristics	Colluvium	Moraine or Till	Fluvioglacial		sandy loam to loamy sand; mapped only along the N. Thompson River	sandy loam to gravelly sand; mapped only alone the N. Thompson River	Ablation Moraine	Fluvioglacial		mapped only along the N. Thompson River

Figure 23. Eutric Brunisol soil associations.

Differences between soil associations within the same forest zone or subzone and developed on the same type of materials.	Bedrock characteristics	Other characteristics	Stolle SL (O.EB)	Carson CS (D.EB)	Chasm CM (D.EB)	Hemp H (D.EB)	Cavanaugh CG (D.EB)	Conant CA (D.EB)	Fleet Creek FL (D.EB)	Dominic DN (D.EB)	Maiden MD (D.EB)	Cumow CX (D.EB)
Elevation as indicated by forest zones	Biophysical Forest Zones	Interior White Spruce Zone										
		Interior Douglas-fir zone; lodgepole pine subzone										
		Interior Douglas-fir zone; ponderosa pine subzone	Fluvio-glacial	Colluvial					Fluvial		Moraine	
	variable			calcareous	basic volcanic	basic volcanic and metamorphic	basic	acidic	mainly volcanic	variable mapped only along the North Thompson River	basic volcanic and calcareous sedimentary	metamorphic

Figure 23 (cont'd). Eutric Brunisol soil associations.

	Biophysical Forest Zones	Inkoiko IK (D.DYB)	Inkitsaph IT (D.DYB)	Teman TR (D.DYB)	Hooligan HO (D.DYB)	Kwoiek KW (D.DYB)	Clapperton CP (O.DYB)	Kanaka KK (D.DYB)	Teather TT (D.DYB)	Abbott AB (O.DYB)
Elevation as indicated by forest zones	Coastal western hemlock – western red cedar zone; Douglas-fir subzone									
	Interior white spruce zone									
	Interior Douglas-fir zone; lodgepole pine subzone									
	Interior Douglas-fir zone; ponderosa pine subzone									
		Fluvioglacial		Colluvium				Shallow Coluvium	Ablation Moraine	
Differences between soil associations within the same forest zone or subzone and developed on the same type of materials.	Bedrock characteristics	mainly granitic	mainly metamorphic	variable	basic volcanic and metamorphic	granitic	acidic	basic	variable	acidic
	Other characteristics									

Figure 24. Dystric, Sombric and Melanic Brunisol soil associations.

Elevation as indicated by forest zones		Kerr KR (O.MB)	Blustery BL (O.SB)	Chataway CY (D.DYB)	Cairn Mountain CR (D.DYB)	Ashton AH (D.DYB)
	Biophysical Forest Zone	Subalpine Engelmann spruce – alpine fir zone				
Differences between soil associations within the same forest zone or subzone and developed on the same type of materials.	Bedrock characteristics	calcareous	volcanic	acidic	basic	basic and calcareous
	Other characteristics	Colluvium				Ablation Moraine

Figure 24 (Cont'd). Dystric, Sombric and Melanic Brunisol soil associations

Differences between soil associations within the same forest zone or subzone and developed on the same type of materials.	Biophysical Forest Zones	Allamore AA (PZ.GL)	Alkali AK (PZ.GL)	Beaverhut BT (PZ.GL)	Mellin ME (PZ.GL)	Allie AL (BR.GL)	Artisan AN (BR.GL)
Elevation as indicated by forest zones	Subalpine Engelmann spruce – alpine fir zone						
	Interior Douglas-fir zone; lodgepole pine subzone						
		Moraine					
	Bedrock characteristics	basic volcanic and metamorphic	basic volcanic and metamorphic	basic volcanic	acid to neutral	basic	basic
	Other characteristics	mapped only on the Shuswap Highlands	mapped only on the Fraser Plateau	mapped only on the Fraser Plateau			
			sandy loam to silty clay loam	sandy loam to loam			

Figure 25. Gray Luvisol soil associations

		Truda Mountain TU (BR.GL)	Bowman BW (O.GL)	Eugene EE (O.GL)	McLaren ML (O.GL)	Minnie MN (O.GL)	Spius Creek SP (O.GL)	Tunkwa TW (O.GL)
Elevation as indicated by forest zones	Biophysical Forest Zones							
	Subalpine Engelmann spruce – alpine fir zone							
	Interior white spruce zone							
	Interior Douglas-fir zone; lodgepole pine subzone							
					Moraine			
Differences between soil associations within the same forest zone or subzone and developed on the same type of materials.	Bedrock characteristics	basic	basic and calcareous	basic	basic and calcareous	acidic	volcanic and granitic	basic
	Other characteristics							

Figure 25 (Cont'd.). Gray Luvisol soil associaitons

Elevation as indicated by forest zones	Biophysical Forest Zone	Kumkan KM (O.HFP)	Klepl Lake KP (O.HFP)	Gorge Creek GG (O.HFP)	Laurel LL (O.HFP)	Tisdall TD (O.HFP)	Tole TL (O.HFP)	Saatin SA (O.HFP)	Tsintsunko TO (O.FHP)
	Subalpine Engelmann spruce – alpine fir zone								
Differences between soil associations within the same forest zone or subzone and developed on the same type of material	Bedrock characteristics	acidic	basic	variable	variable	basic	acid	variable	basic
	Other characteristics	← Shallow Colluvium →		← Fluvioglacial →		← Ablation Moraine →		← Moraine →	

Figure 26. Humo-Ferric and Ferro-Humic Podzol soil associations.

		Cochiwa CV (O.HFP)	Clemson CW (O.HFP)	Calling CL (O.HFP)	Hallamore HA (O.HFP)	Helmcken HN (O.HFP)	Placid PD (O.HFP)	Cedarbench CZ (O.HFP)	Klowa Creek KL (O.HFP)	Kha Lake KH (O.HFP)
Elevation as indicated by forest zones	Biophysical Forest Zones	Subalpine Englemann spruce – alpine fir zone								
		Coastal western hemlock – western red cedar zone; Douglas-fir subzone								
		Colluvium							Colluvium over rock	
Differences between soil associations withing the same forest zone or subzone and developed on the same type of materials	Bedrock characteristics	acidic	limestone	basic	basic	basic volcanic and metamorphic	basic	acidic	acidic	basic
	Other characteristics			mapped only in the Coast Mountains	mapped only in the Shuswap Highlands					

Figure 26 (Cont'd). Humo-Ferric and Ferro-Humic Podzol soil associations.

Elevations as indicated by forest zones	Biophysical Forest Zones	Rayonier RA (O)	Boxer Creek BX (O.R)	Beaverhut BV (O.R)	Oregon Jack O (O)	Rail RL (O)	Bester BR (O.G)	Rennie RE (O.R)	Frisken FR (GL SA.R)	Frances FS (GL CU.R)
	Subalpine Engelmann spruce – alpine fir zone									
	Interior white spruce zone									
	Interior Douglas-fir zone; lodgepole pine subzone									
	Interior Douglas-fir zone; ponderosa pine subzone									
		Organic	Fluvio-glacial	Fluvial	Organic	Organic	Fluvial	Fluvio-glacial	Fluvial	
Differences between soil associations within the same forest zone or subzone and developed on the same type of materials.	Bedrock characteristics	N/A	variable	basic	N/A	N/A	variable	variable	variable	variable
	Other characteristics								poorly, drained, saline	poorly drained

Figure 27. Regosol, Gleysol and Organic soil associations.

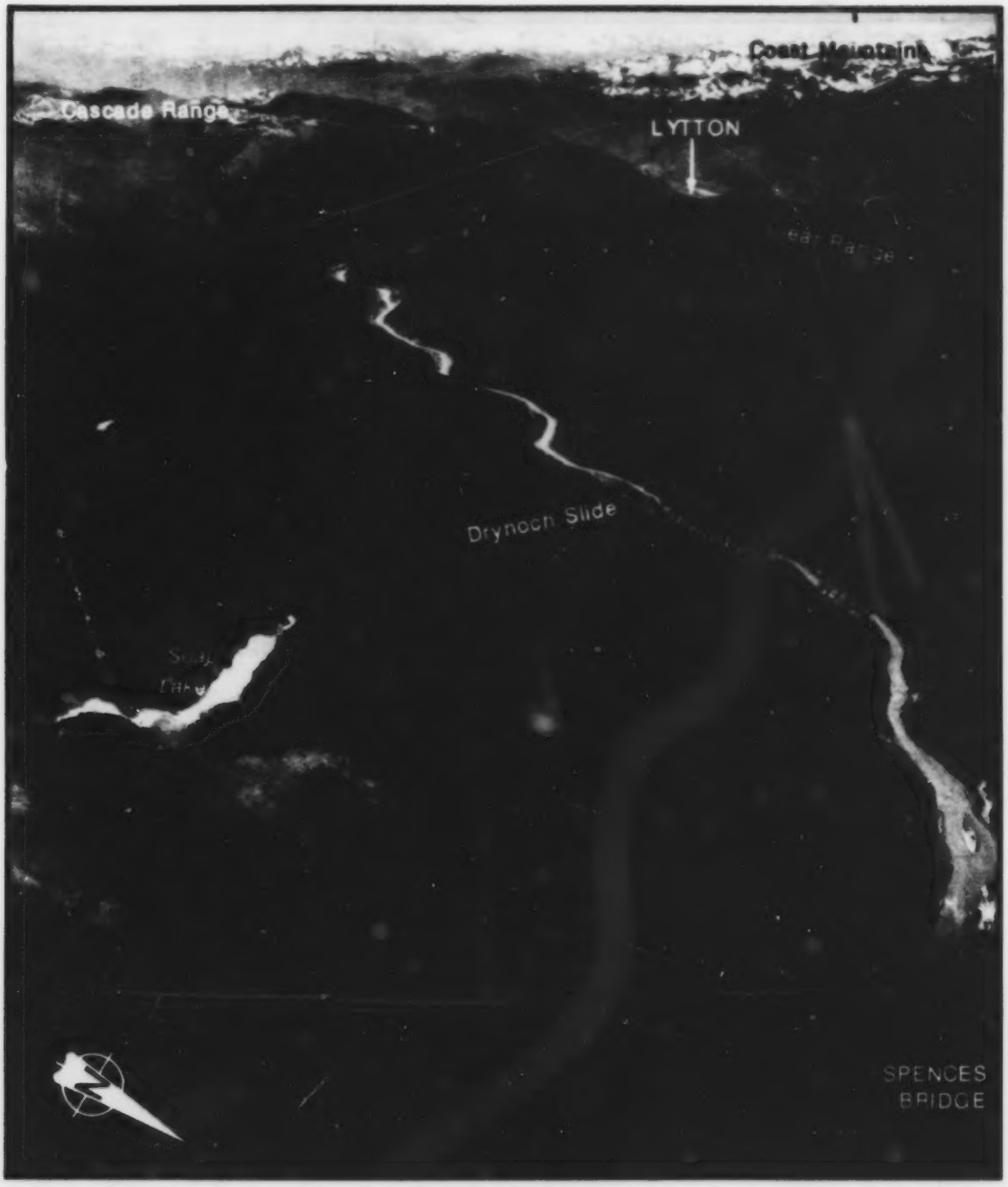


Plate 4: Thompson River downstream of Spences Bridge

The open grasslands in the foreground have Dark Brown Chernozem soils (Trapp Lake Association) developed on medium textured morainal materials. The Douglas fir and ponderosa pine forests surrounding Soap Lake are primarily on soils of the Tunkwa or Timber associations. Soils of the Glossey association are common along the Thompson River at lower elevations. They are coarse textured, rapidly drained, have developed on fluvioglacial materials and exhibit Eutric Brunisol profiles. The Drynock landslide is the subject of a special report (Vandine, 1980). B.C. Photo 633:61.

Chapter Four

A Description of the Soil Associations and Their Characteristics

This chapter of the report first describes and defines the soil/landform map symbols used on the maps. The symbols are explained in more detail than the descriptions given on the map legend.

Secondly, the abbreviations used in the description of soil associations, such as drainage classes and stoniness are defined.

Thirdly, a general key to the soil association is given to show the various physiographic regions, bedrock groups, and biophysical forest zones used to construct the legend.

The majority of the chapter describes in alphabetical order, the soil associations and their components for the map area.

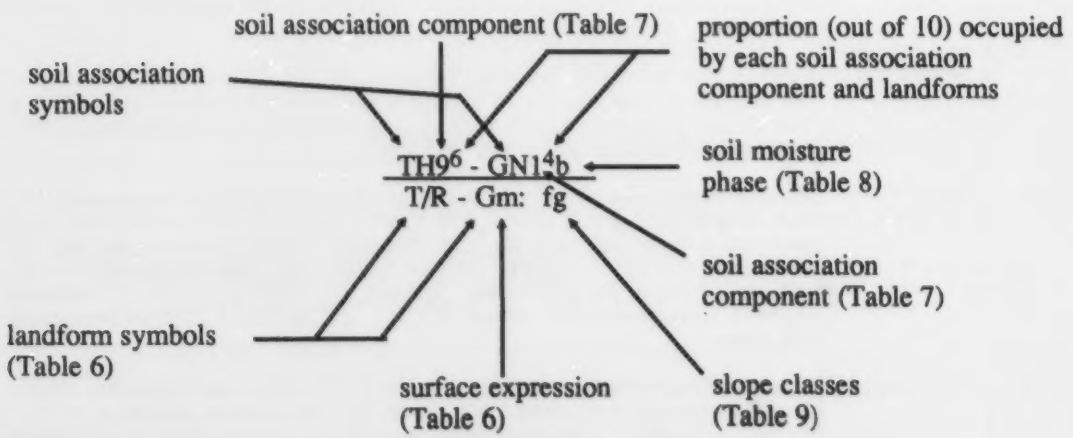
4.1 Map Symbols

Whenever possible, soil association names have been chosen to begin with the letter of the landform or parent material on which they occur. For example, names of soil associations developed on colluvium often begin with 'C', those on till or moraine begin with a 'T' or 'M', while those on fluvial and fluvioglacial deposits begin with 'F' or 'G' respectively. This convention could not be maintained in all cases for naming soil associations since previously named soil associations beginning with different letters also occur within and adjacent to the map area.

1. Simple Map Units

This map unit contains soils of the Trachyte Association (TH), Component 4. The soils are most commonly Orthic Black Chernozems with less common Orthic Gray Luvisols. These soils are developed on drumlinized till (Td) with simple, unidirectional slopes from 9 to 30%.

2. Compound Map Units


soil association component (Table 7)
proportion (out of 10) occupied by each soil association component and landforms
soil association symbols
TH9[6] - GN1[4]b
T/R - Gm: fg
soil moisture phase (Table 8)
soil association component (Table 7)
landform symbols (Table 6)
surface expression (Table 6)
slope classes (Table 9)

This map unit contains approximately 60 percent soils of the Trachyte Association (TH), component 9, and approximately 40% soils of the Gisborne Association (GN), component 1. The Trachyte association varies for loam to silt loam. The most common soils in component 9 of the Trachyte Association are well drained Orthic Black Chernozems while well to imperfectly drained Saline Blacks and/or Calcareous Blacks are less common. This association is developed on till deposited over rock (T/R). The Gisborne Association, found in approximately 40% of the area, is developed on rolling glaciofluvial materials (Gm). The profile development of this rapidly to well drained, gravelly to very gravelly soil is Degraded Eutric Brunisol, however, some minor areas are moderately well to imperfectly drained (b). The entire area has complex slopes (multi-directional) from 15 to 60%.

4.2 Landform Definitions

The general distribution of surficial materials and a brief summary of glacial history and recent geomorphic events has been outlined in Chapter 1.7.2. Definitions of landforms (surficial materials and surface expressions) and map symbols are given in Table 6, adapted from E.L.U.C., 1978.

Table 6. Definition of Landforms and Map Symbols for the Soil/Landform Maps of the Ashcroft Map Area

Map Symbol	Name	Landform Definition
A	Ablation Moraine	Material deposited directly by melting of glacier ice. The deposit is marked by its partial loss of fine constituents to meltwater streams, its' non-compact nature, and the random orientation of the particles.
C	Colluvium	Material that has reached its present position by direct gravity induced movement, with no agents of transportation involved. Its' character depends on the nature of the material from which it was derived. Colluvium derived from bedrock is characteristically rubbly (e.g. talus cone, rubbly colluvial blanket) while colluvium derived from unconsolidated sediments usually resembles the material from which it originated (e.g. landslide, mudflow fan).
E	Eolian	Material transported and deposited by wind. The deposit generally consists of fine to medium sand and coarse silt that is well sorted and poorly compacted. It may contain internal structures such as cross-bedding or ripple laminae, or may be massive. Individual grains may be frosted.
F	Fluvial	Material transported and deposited by streams and other moving water; the term is synonymous with alluvial. The material generally consists of gravel and/or sand with a minor fraction of silt (and rarely clay) with is commonly well to moderately well sorted and displays stratification. The gravel is typically rounded with sand between the gravel sized particles. The material consists of overbank deposits, channel deposits, terrace deposits, and landforms such as floodplains and deltas.
G	Fluvioglacial	Fluvial materials which present clear evidence of having been deposited either directly in front of, or in contact with glacier ice. The deposits include such features as kettles, ridged topography (eskers), hummocky or otherwise irregular topography (kames and kame terraces).

Table 6 (cont'd). Definition of Landforms and Map Symbols for the Soil/Landform Maps of the Ashcroft Map Area

Map Symbol	Name	Landform Definition
T	Morainal (glacial till)	Material which has been transported beneath, and deposited directly by glacial ice and has not been modified by an intermediate agent. Generally, it conisists of well-compacted material that is non-stratified and contains a heterogeneous mixture of paricle sizes, often in a matrix of sand, silt, and clay.
L	Lacustrine (includes glaciolacustrine)	Sediments that have settled from suspension in bodies of standing fresh water, or sediments that have accumulated at their margins through the action of waves. Sediments commonly consist of stratified fine sand, silt and/or clay.
O	Organic	Material resulting from vegetation growth, decay and accumulation in and around closed basins where rate of accumulation exceeds that of decay.
R	Rock Outcrops	Exposed rock or rock coveered by a thin veneer (less than 10 cm) of unconsolidated materials.

Surface Expession		
c	channelled	Surfaces crossed by a series of channels.
d	drumlinized	Surfaces with streamlined more or less parallel hills (drumlins).
f	fan	A fan-shaped form that can be likened to the sector of a cone, and possessing a perceptible gradient from apex to toe.
h	hummocky	Steep sided hillocks and hollows with multi-directional slopes dominantly between 10° and 35° (unconsolidated materials) and steeper (consolidated materials), and with local relief greater than 1 meter. In plan view an assemblage of non-linear, generally chaotic forms.
m	rolling	Linear and non-linear forms with slopes ranging up to 10° and with local relief greater than 1 meter; differs from hummock only by virtue of having gentler slopes.
p	plain	A flat or very gently sloping (less than 5°) unidirectional surface with a generally constant slope not broken by marked elevational changes or depressions of greater than 1 meter local relief.
s	steepland	Erosional slopes generally greater than 35° on both unconsolidated and consolidated materials.
t	terraced	Scarp face and the horizontal or gently inclined surface (tread) above it.
v	dissected	Surfaces modified by fluvial erosion, resulting in the development of parallel and subparallel, steep sided and narrow ravines and gullies in both consolidated and unconsolidated materials.

Shallow materials, less than 1 metre thick, are indicated by the use of a slash(/); for example, shallow colluvium over bedrock is C/R. Only two material thickness classes are recognized within the landform symbol. These are less than 1 metre (shallow), and greater than 1 metre (deep) in thickness. A third depth criteria, less than 50cm (very shallow or lithic), is recognized in the components of some soil associations. Most soil associations have deep soils as the modal component 1 and shallow soils are indicated by components 5 or 6. Some associations however, have been defined in which the modal or component 1 is shallow; these mostly occur in the Coast and Cascade mountains.

4.3 Definition of Soil Association Components

Soil associations are divided into components which differ from one another based on changes in soil development due to variation in drainage, texture, soil depth, land use (cultivation), or climate. Table 7 defines the component numbers in more detail than the definitions found on the map legends.

In the legend attached to the maps, the term 'modal' describes the most common soil in all the components of the soil association, except for component 6. Component 6 indicates the most common soil in the association is very shallow or lithic (<50 cm in depth) and the modal soil is less common.

A modal soil profile is generally defined as having developed on deep, well drained, medium textured materials located in midslope positions on uniform gentle slopes and is the result of the interaction of the soil-forming factors (parent materials, climate, relief, soil organisms and time).

In the context of Ashcroft map area, a somewhat broader definition has been applied and the modal soil has been used to describe the most commonly occurring soil profile development in the soil association. Soils developed on rapidly drained, coarse textured materials or on very poorly drained, nearly level organic deposits, for example, are also described as the most commonly occurring modal soils described by component 1 of each association.

The modal soil of an association is the most commonly occurring soil or the central concept of the association and is described by component 1. All other components contain a significant proportion of a less common soil that in some way varies from the modal soil described by component 1.

Table 7. Definition of Soil Association Components

Soil Component	
1	This component consists only of the modal or most commonly occuring soil in the association. It is the central concept of the association and has usually developed on well drained, deep materials in a mid-slope position.
2	The less common soil is drier than the most common soil, due to either somewhat coarser textures, southern exposures, or being located in a slightly drier climates (eg. south aspects). This component usuallly occurs at the lower elevation of the soil association elevation range.
3	The less common soil is moister than the most common soil, due to somewhat finer textures, northerly aspects, or being located in areas which receive slightly more moisture than component 1. The increased moisture often causes deeper soil weathering sufficient to produce a different taxonomic subgroup or order. Typicallly this soil component occurs at the upper parts of the elevational range of the soil association.
4	The less common soil varies from the modal due to ecological differences. The less common soil differs from the modal due to a historical alteration of vegetation (i.e. land clearing), or the present vegetation pattern is highly contrasting for the area. For example, clearings in some forested areas have developed Chernozemic-like soil profiles whereas the profiles under forest are Brunisolic. In the Dominic (DN), Fleet Creek (FL), and Scuitto (ST) associations, component 4 describes ecological variations due to imperfectly or poorly drained less common soils. In the Curnow (CX), Cedarbench (CZ) and Klept Lke (KP) associations, component 4 includes ecologically different soils developed on avalanche tracks. In the poorly drained Bester association, component 4 indicates the inclusion of an edaphically drier, well drained, less common soil. In the Cache Creek (CC) and Frances (FS) associations, component 4 indicates a less common saline soil, while in the Shumway (SM) association it indicates the less common soil is eroded. In the Dunleavy (D) association, component 4 identifies that the less common soil is higher in clay content than the modal.
5	The less common soil is shallow (lithic, less than 50 cm thick) overlying bedrock.
6	Lithic soils (soils less than 50 cm thick) overlying bedrock are most common and bedrock outcrops occupy a significant portion of the map unit.
7	The less common soil has developed in steep talus deposits. This component only occurs where material addition and instabillity have retarded soil horizon development and the less common soil is regosolic.
8	The less common soil occupies areas affected by sheet, gully or rill erosion.
9	The less common soil is alkaline and/or saline.
10	The less common soil is mainly due to cultivation and usually has an identifiable plough payer at the soil surface.
11	The less common soil varies from the modal (component 1) soil due to differences in texture and soil profile development.
12	The less common soil varies from the modal (component 1) soil due to cold air pooling.

4.4 Soil Moisture Phases

The development of the soil associations and their components is based primarily on the more common well or rapidly drained soil moisture regime. Variations occur in the field as a result of the presence of seepage, or the accumulation of seepage in the soil profile. The movement of moisture is determined by the slope angle, slope length, and the nature of the parent material. In many cases where seepage is present, it is not reflected within the soil profile yet there is an improvement in site productivity. Since the improved productivity is usually reflected in denser, better developed vegetation and can be seen on the ground and on the aerial photographs, a system of Soil Moisture Phases (based primarily on slope position) has been devised and is described in Table 8. The symbols 'a', 'b' and 'c' may be used either singularly or in combination as the landscape and soil moisture condition requires. An example follows:

TWlab — The moisture phases indicate that the normally well drained Tunkwa soil in the mid-slope position transmits seepage from upslope (Symbol 'a'). Furthermore, there are some locations in the map unit, at the base of slopes or in swales, which tend to receive more seepage than they transmit (Symbol 'b').

Table 8. Soil Moisture Phases*

Map Symbol	Description
no symbol	The soil is usually well or rapidly drained. It usually occupies the upper slopes and crests of the topography and does not receive significant seepage from upslope. It is the normal soil condition for the soil association.
a	The soil is well drained. It usually occurs in mid-slope positions and transmits seepage from upslope. The increased moisture status is not reflected in soil morphology.
b	The soil is moderately well to imperfectly drained. It usually occupies the lower slopes and tends to receive more seepage than it transmits. Weak to moderate mottling in the lower solum is usual.
c	The soil is imperfectly or poorly drained. It usually occupies the toes of slopes or depressional areas. Downslope seepage tends to accumulate as evidenced by well developed mottling or gleying in the solum.

*Soil moisture phases do not apply to the whole soil association component in a map unit. They indicate small areas within a map unit that differ in moisture status from the normal, and are either too small or disjointed to be mapped separately. Soil moisture phases are primarily based on slope position as interpreted on aerial photographs.

4.5 Slope Classes

Slope classification in Ashcroft map area is taken from the System of Soil Classification for Canada (Canadian Soil Survey Committee, 1973).

Table 9. Slope Classification

Simple Topography Single Slopes		Complex Topography Multiple Slopes		Slope
A	depressional to level	a	nearly level	0 to 0.5
B	very gently soping	b	gently undulating	0.5+ to 2
C	gently sloping	c	undulating	2+ to 5
D	moderately sloping	d	gently rolling	5+ to 9
E	strongly sloping	e	moderately rolling	9+ to 15
F	steeply sloping	f	strongly rolling	15+ to 30
G	very steeply sloping	g	hilly	30+ to 60
H	extremely sloping	h	very hilly	over 60

Examples:

GH – dominantly very steeply sloping (G) topography with gradients between 30 and 60% together with significant inclusions of extremely sloping (H) topography with gradients greater than 60%.

Gf – dominantly very steeply sloping (G) topography with significant inclusions of strongly rolling (f) topography having slopes between 15 and 30%.

gf – hilly (30 to 60%) multiple slopes (g) are dominant with significant inclusions of strongly rolling (15 to 30%) multiple slopes(f).

4.6 Soil Drainage Classes

Soil drainage is a result of the permeability of the soil and underlying material. Drainage classes are determined by the length of time excess moisture remains in the soil profile and by the degree to which secondary development of mottling and gleying occurs. Classes are described in Table 10. Soil drainage is described for major and minor components of all soil associations.

Table 10. Soil Drainage Classes

Symbol	Class	Definition
r	rapidly drained	The soil moisture content seldom exceeds field capacity in any horizon except immediately after water additions.
w	well drained	The soil moisture content does not normally exceed field capacity in any horizon (except possibly the C) for a significant part of the year.
m	moderately well	Soil moisture in excess of field capacity remains in subsurface horizon for a small but significant period of the year.
i	imperfectly drained	Soil moisture in excess of field capacity remains in subsurface horizons for moderatley long periods during the year.
p	poorly drained	The soil moisture in excess of field capacity remains in all horizons for a large part of the year.
vp	very poorly	Free water remains at of within 12 inches (30 cm) of the soil surface for most of the year.

4.7 Description of the Soil Associations of the Ashcroft Map Area

The following section briefly describes the characteristics of the soil associations (and components) in the Ashcroft map area. The soil associations are listed alphabetically by soil association name. Each association is further identified by the physiographic region(s) and forest zone(s) for the area in which it occurs. The general extent and distribution of the various soil associations within the survey area is also given.

The soil texture and soil parent material (bedrock type and landform) as well as surface stoniness is briefly described. Textures are those defined by the Canada Soil Survey Committee, 1973 and 1978. Gravel content (fragments between 2 and 15 cm in diameter) is identified by modifiers attached to the texture name. Contents between 25 and 50% (by volume) are indicated by 'gravelly' while contents between 50 and 90% are indicated by 'very gravelly'. Stoniness is a measure of the presence of coarse fragments that are greater than 15 cm in diameter and occur on or near the soil surface. Table 11 shows the classes of stoniness.

Table 11. Stoniness Classes

Classes	Description
Nonstony	Stones are either not present or occupy less than 0.01% of the soil surface.
Slightly Stony	Some stones are present but hinder cultivation only slightly or not at all (0.01-0.1% of the surface covered, stones 10-30 m apart).
Moderately Stony	Sufficient stones are present to cause some interference with cultivation (0.1-3% of surface covered, stones 2-10 m apart).
Very Stony	Stones are present in sufficient quantity to seriously handicap cultivation; some clearing is required (3-15% of surface covered, stones 1-2 m apart).
Exceedingly Stony	Stones are present in sufficient quantities to prevent cultivation until considerable clearing is done (15-50% of surface covered, stones 0.1-0.5 m apart).
Excessively Stony	The land surface is too stony to permit cultivation; it is a boulder or stone pavement (more than 50% of surface covered, stones less than 0.1 m apart).

The elevation range of each soil association is also listed. All soil associations that have been sampled and analyzed are identified. These detailed soil descriptions and analyses are stored in the B. C. Soil Information System.

Components of each soil association are given as are their taxonomic classification and drainage classes. Also given is a brief description of how the components differ from the modal soil (component 1) in the soil association.

Soil associations established in areas adjacent to the Ashcroft map area were maintained in the map area wherever possible. Superscript (1) identifies those soil associations which were initially defined in map area 92P/E (Gough, 1988, *Soils of the Bonaparte River-Canim Lake Map Area*) while a superscript (2) indicates those which have been adapted from Valentine (1980), *Soils of the Lac La Hache – Clinton Area* (map area 92P/W). Superscript (3) identifies soils associations described by Kowall (1980), *Soil and Terrain of the Seymour Arm Area* (N.T.S. Map 82 M). Many of the associations from the adjacent surveyed areas have limited distribution in the Ashcroft map area and are more fully described in the soil reports for these adjacent areas. Further information on soil correlation with adjacent areas and earlier soil surveys is also contained in the Appendix.

Table 12. General Key to Soil Associations of the Thompson Plateau

Physiographic Region		Thompson Plateau (Often Includes Soil Asociations Also Mapped on the Fraser Plateau)																					
Major Bedrock Types		Acid (Granitic)			Basic (Volcanic and Metamorphic)						Calcareous			Basic and Calcareous			Mixed					
Bio-Physical Forest	Region	Dry Interior			Dry Interior						Dry Interior			Dry Interior			Dry Interior					
	Zone	ID		SAeS-alF	IBG	ID		IWS	SAeS-alF	At	IDF		SAeS-alF	IBG	ID		IBG	ID		IwS	SAeS-alF	
	Subzone	a	b			a	b				a	b			a	b		a	b			
Soil Parent Materials																						
Albation Moraine									TD						AY	AY, AD						
Colluvium, Shallow						KK																
Colluvium		CA	CP	CY		CO, CG	CM, H, HO	HH	CR, PD, HN, HA, BL		SO	CS, CW	CW	CC, CB			CT					
Moraine (Till)			MN, SP*	ME*	TQ	TE TP, TM	TE, AN, TW, TH, AL, SP*	EE	BT, AK, TO, TU, ME*, AL		MS	MS	BW	MG	MQ, MD	ML, MA, MC		TT				
Fluvial																	FT, ST	FL, DN, FS, FR	BR	BV		
Fluvioglacial			AB	TL, GG*					GG*								GD, SM	GS, SR, RE, GV, GW	GN, SE, D, HD, GW	TR, SL	LL, BX	
Lacustrine																	LM	LS, LD				
Organic		O*	O*			O*	O*	RL	RA*					O*	O*			O*	O*	RL	RA*	

*Soil association occurs in more than one bedrock group

Table 13. General Key to Soil Associations of the Coast Mountains, Fraser Plateau and Shuswap Highlands

Physiographic Region		Coast Mountains						Fraser Plateau										Shuswap Highlands
Major Bedrock Types		Acid (Granitic)		Basic (Metamorphic)		Mixed		Basic (Volcanic)			Acid			Mixed		Calcerous		Basic (Metamorphic)
Bio-Physical Forest	Region	Coastal-Interior Transition						Dry Interior										Dry Interior
	Zone	CwH-wC	SAeS-alF	CwH-wC	SAeS-alF	CwH-wC	SAeS-alF	ID	IwS	SAeS-alF	ID		SAeS-alF	ID		IwS	ID	SAeS-alF	SAeS-alF
	Subzone	b						a			a	b		a	b		b		
Soil Parent Materials																			
Albation Moraine													TL						
Colluvium, Shallow		KL	KM		KP		CL	KK				KW							HA
Colluvium		KH, CZ	CV	CX					HH	CR, PD	BX						CN	KR, CW	
Moraine (Till)							SA			AK								BW	AA
Fluvial						IK										BV			
Fluvioglacial						IT								IZ	HD			AH	
Lacustrine																			
Organic										RA*			RA*					RA*	

*Soil association occurs in more than one bedrock group

ABBOTT SOILS (AB)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Fairly extensive distribution on south aspects in the Highland Valley, and areas surrounding Roscoe and Chataway lakes and Mount Mabel; also near Pennask Lake. *Seepage may accumulate in depressions, especially in component #4.	Gravelly to very gravelly sandy loam to coarse sand. Medium acid, ice-contact (ablation moraine) deposits associated with granitic bedrock. Generally exceedingly to excessively stony. Two profiles described and sampled; a Modal profile (Orthic Dystric Brunisol) and a variant profile (Brunisolic Gray Luvisol). Elevations range between 1050 and 1650 m (3500 and 5500 ft.).	AB1	Orthic Dystric Brunisol	r	-	-	Moderately rolling to hilly (10%-60%) slopes).
		AB2	Orthic Dystric Brunisol	r	Degraded Eutric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southern aspects, lower elevations or combination.
		AB3	Orthic Dystric Brunisol	r	Degraded Dystric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to nothern aspects, upper elevations or combination.
		AB4	Orthic Dystric Brunisol	r	Podzolic Gray Luvisol	w	Up to 40% inclusions of less common soil which has textures somewhat finer than the modal.
		AB10	Orthic Dystric Brunisol	r	Orthic Sombric Brunisol	r	up to 40% inclusion of less common soil due to cultivation

ALKALI SOILS [1](AK)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; subalpine Engelmann spruce – alpine fir zone. Limited distribution on the Tranquille Plateau north of Kamloops	Sandy loam to silty clay loam morainal deposits associated with basic volcanic and metamorphic bedrock. Generally moderately to very stony. Elevations range from 1350 to 1650 m (4500 to 5500 ft).	AK1	Podzolic Gray Luvisol	w	-	-	Moderately sloping to strongly rolling (5-20% slopes).
		AK2	Podzolic Gray Luvisol	w	Brunisolic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be southern aspects, lower elevations or combination.
		AK3	Podzolic Gray Luvisol	w	Luvisolic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically wetter conditions. These may be due to northern aspects, upper elevations or combination.
		AK5	Podzolic Gray Luvisol	w	Lithic Humo-Ferric Podzol	r	Up to 40% inclusions of less common soil which is <50 cm thick over bedrock.

ALLAMORE SOILS [1,2] (AA)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Shuswap Highland Physiographic Region; Dry Interior Forest Region; Subalpine Englemann spruce – alpine fir zone. Limited distribution, mostly north of Heffley Lake. *Seepage at the base of some slopes and in depressions will improve the site pordutivity.	Sandy loam to silty clay loam morainal deposits associated with basic volcanic and metamorphic bedrock. Generally moderately to very stony. Elevations range from 1350 to 1650 m (4500 to 5500 ft).	AA1	Podzolic Gray Luvisol	w	-	-	Moderately sloping to strongly rolling (5-30% slopes).
		AA2	Podzolic Gray Luvisol	w	Brunisolic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southern aspects, lower elevations or combination.
		AA3	Podzolic Gray Luvisol	w	Podzolic Gray Luvisol	w,i	Up to 40% inclusion of taxomonically similiar but more deeply weathered, less common soil which has developed under edaphically moister conditions, due to north aspects, or lower slope positions.
		AA4	Podzolic Gray Luvisol	w	Sombric Humo-Ferric Podzol	w,i	Up to 40% inclusion of less common soil which has developed under mainly shrub and/or forb vegetation at higher elevation.
		AA5	Podzolic Gray Luvisol	w	Lithic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which is <50cm thick over bedrock.
		AA6	Lithic Humo-Ferric Podzol	r	Rock Outcrop	r	-

ALLIE [3] SOILS (AL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Very limited distribution in northeastern part in the Jameson Range.	Medium to moderately coarse textured morainal deposits associated with basic bedrock. Generally moderately stony. Elevations range from 1160 to 1220 m (3800 to 4000 ft).	AL1	Brunisolic Gray Luvisol	W	-	-	Moderately sloping to strongly rolling topography.
		AL2	Brunisolic Gray Luvisol	W	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southern aspects, lower elevations or combination.

ANDREW SOILS (AD)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Fairly extensive distribution, mainly around Plateau Lake, north of Douglas Lake, between Nicola, Tunkwa and Shumway lakes and west of the Deadman River.	Gravelly to very gravelly sandy loam or loamy sand, neutral ice-contact (ablation moraine) deposits associated with basic volcanic and limestone bedrock. Generally moderately to exceedingly stony. Elevations range between 750 and 1200 m (2500 and 4000 ft).	AD1	Degraded Eutric Brunisol	w	-	-	Gently rolling to hilly (5 to 50% slopes).
		AD2	Degraded Eutric Brunisol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil with similar morphology but occuring under edaphically or climatically drier conditions. Change is due to southern aspects, lower elevations or combination.
		AD3	Degraded Eutric Brunisol	w	Orthic Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions due to northerly aspects, upper elevations, or combination.
		AD4	Degraded Eutric Brunisol	w	Orthic Black, Orthic Dark Gray	w w	Up to 40% inclusion (in total) of less common soils which have developed mainly under grassland and/or shrub vegetation.

ARTISAN SOILS[1,3] (AN)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Fairly extensive distribution in the vicinity of Hefley Lake and north of Isabel Lake. *Seepage at base of slopes may improve site productivity while in depressions it may retard growth.	Sandy loam to silty clay loam morainal deposits associated with basic volcanic and metamorphic bedrock. Generally moderately to very stony. Elevations range from 1050 to 1350 m (3500 to 4500 ft).	AN1	Brunisolic Gray Luvisol	w	-	-	Moderately to steeply sloping (5-30% slopes).
		AN2	Brunisolic Gray Luvisol	w	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southern aspects, lower elevations or combination.
		AN3	Brunisolic Gray Luvisol	w	Podzolic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northern aspects, upper elevations or combination.
		AN4	Brunisolic Gray Luvisol	w	Dark Gray Luvisol	w	Up to 40% inclusion of less common soil caused by highly contrasting vegetation.
		AN5	Brunisolic Gray Luvisol	w	Lithic Dystric Brunisol	r	Up to 40% inclusion of less common soil which is <50cm thick over bedrock.
		AN6	Lithic Dystric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusions of exposed bedrock.

ASHTON SOILS (AH)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Very limited distribution.	Sandy loam to coarse sand, neutral, ice-contct (ablation moraine) deposits associated with basic volcanic and limestone bedrock. Elevations range between 1200 and 1950 m (4000 and 6500 ft).	AH1	Degraded Dystric Brunisol	r	-	-	Strongly rolling to hilly (15-60% slopes.

AYLMER SOILS (AY)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with or without seral ponderosa pine). Grass and shrub disclimax.	Gravelly to very gravelly sandy loam or loamy sand, moderately to strongly alkaline ice-contact (ablation moraine) deposits associated with basic volcanic and limestone bedrock. Generally moderately to very stony.	AY1	Orthic Black	w	-	-	Gently to strongly rolling (3-30% slopes). Vegetation pattern due to fire and grazing. Grassland vegetation probably the result of historical fires.
		AY2	Orthic Black	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southernly aspects, lower elevations or combination.
Restricted distribution between Quilchena and Douglas creeks, Chapperon and Trapp lakes, and near Lac du Bois. *Seepage in depressions may improve site productivity.	One modal profile (Orthic Black) described and sampled. Elevations range between 910 and 1220 m (3000 and 4000 ft).	AY4	Orthic Black	w	Degraded Eutric Brunisol, Orthic Dark Gray	w w	Up to 40% inclusions (in total) of less common soils which have developed under mainly forested conditions.
		AY11	Orthic black	w	Gleyed Black	i	Up to 40% inclusion of less common soil due to seepage and/or restricted drainage.

BEAVER SOILS (BV)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Interior white spruce zone. Very limited distribution on the Tranquille Plateau.	Fine sandy loam to loamy sand fluvial deposits. Generally slightly to very stony. Elevations range from 330 to 1050 m (1100 to 3500 ft).	BV2	Orthic Regosol	w,i	Orthic Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under drier conditions on upper terraces. Undulating (2-5% slopes).
		BV3	Orthic Regosol	w,i	Orthic Gleysol	p	Up to 40% inclusion of less common soil which is subject to permanently high water tables.

BEAVERHUT SOILS[1] (BT)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann Spruce – alpine fir zone. Restricted distribution on the Tranquille Plateau. *Seepage at the base of slopes improves site productivity while in depressions it may cause reductions.	Sandy loam or loam morainal deposits associated with volcanic bedrock. Generally moderately to very stony. Elevations range from 1350 to 1650 m (5000 to 5500 ft).	BT1	Podzolic Gray Luvisol				Moderately sloping to strongly rolling (5-30% slopes).
		BT2	Podzolic Gray Luvisol	w	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southern aspects, lower elevations or combination.
		BT3	Podzolic Gray Luvisol	w	Podzolic Gray Luvisol	i,w	Up to 40% inclusion of taxonomically similar but more deeply weathered less common soil due to edaphically or climatically moister conditions.
		BT5	Podzolic Gray Luvisol	w	Lithic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		BT6	Lithic Humo-Ferric Podzol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

BESTER SOILS (BR)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Limited distribution in the northeast corner of the map area.	lt loam or fine sandy loam overlying loamy sand or sand fluvial deposits. Generally stone-free or slightly stony. Elevations range from 330 to 480 m (1100 to 3500 ft).	BR1	Orthic Gleysol	p,vp	-		Very gently sloping to gently undulating (less than 2% slopes).
		BR3	Orthic Gleysol	p,vp	Orthic Humic Gleysol	vp	Up to 40% inclusion of less common soil which has a well developed, organic matter enriched surface horizon.

BLUSTERY SOILS (BL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comment
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone; krummholz subzone. Limited distribution, mainly between Upper Hat Creek and Lillooet.	Sandy loam or loam, acidic to neutral colluvium associated with volcanic bedrock. Generally very to exceedingly stony. Elevations range between 1950 and 2175 m (6500 and 7520 ft).	BL1	Orthic Sombric Brunisol	r	-	-	Strongly sloping to hilly (10-60% slopes).
		BL2	Orthic Sombric Brunisol	r	Orthic Dystric Brunisol	r	Up to 40% inclusion of less common soil on somewhat coarser textures or southern exposures.
		BL4	Orthic Sombric Brunisol	r	Orthic Dystric Brunisol	r	Up to 40% inclusion of less common soil developed under mainly closed forest conditions.
		BL5	Orthic Sombric Brunisol	r	Lithic Sombric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.

BOWMAN SOILS (BW)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Restricted distribution in the vicinity of Pavilion Mountain and Cornwall Hills. *Seepage at base of medium and long slopes and in depressions may improve site productivity.	Silt loam or silty clay loam, moderately to very strongly calcareous morainal deposits associated with basic volcanic and limestone bedrock. Generally moderately to exceedingly stony. Elevations range between 1650 and 2100 m (5500 and 7000 ft).	BW1	Orthic Gray Luvisol	w	-	-	Steeply sloping to very hilly (15-over 60% slopes).
		BW2	Orthic Gray Luvisol	w	Orthic Eutric Brunisol	w	Up to 40% inclusion of less common soil due to edaphically or climatically drier conditions.
		BW4	Orthic Gray Luvisol	w	Orthic Melanic Brunisol	w	Up to 40% inclusion of less common soil under dominantly forbs and/or shrubs.
		BW5	Orthic Gray Luvisol	w	Lithic Gray Luvisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.

BOXER CREEK SOILS (BX)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Very limited distribution in the northeastern portion of the map area.	Gravelly sand to sandy loam fluvial deposits. Generally moderately to very stony. Elevations range from 1050 to 1650 m (3500 to 5500 ft).	BX2	Gleyed Orthic Regosol	i	Orthic Regosol	w	Up to 40% inclusion of less common soil which is unaffected by periodic high water tables. Undulating (2-5% slopes).

CACHE CREEK SOILS (CC)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Bunchgrass zone. Limited distribution in the Semlin and Bonaparte valleys near Cache Creek, and east of Merritt.	Sandy loam or loam, mildly to moderately alkaline colluvial fan deposits associated with basic volcanic and limestone bedrock. Generally slightly to moderately stony. A modal profile (Calcareous Rego Brown) described and sampled. Elevations range between 300 and 750 m (1000 and 2500 ft).	CC3	Calcareous Rego Brown	w	Orthic Brown	w	Up to 40% inclusion of less commmon soil which has developed under edaphically or climatically moister conditions, or in areas of less alkaline parent material. Very gently to moderately sloping (less than 10% slopes).
		CC11	Calcareous Rego Brown	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soil which is due to cultivation.

CAIRN MOUNTAIN SOILS (CR)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann spruce–alpine fir zone. Fairly extensive distribution north of Lillooet, between Hat Creek and Fraser River and between Nicola and Fraser rivers. *Seepage at the base of slopes will improve site productivity.	Gravelly sandy loam or gravelly loam, neutral colluvial deposits associated with volcanic bedrock. Generally moderately to extremely stony. Elevations range from 1650 to 2100 m (5500 to 7000 ft).	CR1	Orthic Dystric Brunisol	w	-	-	Moderately to extremely sloping (5 to over 60% slopes).
		CR2	Orthic Dystric Brunisol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		CR3	Orthic Dystric Brunisol	w	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		CR4	Orthic Dystric Brunisol	w	Orthic Sombric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and/or forb vegetation at higher elevations.
		CR5	Orthic Dystric Brunisol	w	Lithic Dystric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		CR6	Lithic Dystric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		CR7	Orthic Dystic Brunisol	w	Orthic Regosol	w	Up to 40% inclusion of less common soils located in avalanche tracks.

CALLING SOILS (CL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast Mountains Physiographic Region; Coastal Forest Region (Coastal Transition Section); Subalpine Engelmann spruce – alpine fir zone. Limited distribution in valleys west of the Fraser Valley. *Seepage occuring at base of slopes will improve site productivity; may be a constraint to engineering.	Sandy loam or loam, neutral colluvial deposits associated with metamorphic bedrock. Generally very to excessively stony. Elevations range from 1350 to 1800 m (4500 to 6000 ft).	CL1	Orthic Humo-Ferric Podzol	w	-	-	Strongly to very steeply sloping (10-60% slopes).
		CL2	Orthic Humo-Ferric Podzol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		CL4	Orthic Humo-Ferric Podzol	w	Sombric Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under mainly deciduous vegetation resulting from exposure and/or avalanching.
		CL7	Orthic Humo-Ferric Podzol	w	Orthic Regosol	r	Up to 40% inclusion of less common soil which has developed in areas of active mass wasting (talus).

CARABINE SOILS (CB)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Bunchgrass zone. Limited distribution north of Kamloops and in the vicinity of Ashcroft.	Sandy loam or loam, moderately to strongly alkaline colluvial fan deposits associated with basic volcanic and limestone bedrock. Generally slightly to moderately stony. Shallow, sandy to silty eolian materials have been incorporated into or occur on the soil surface. Two profiles sampled, one modal (Orthic Brown), the other a Carbonated Dark Brown in component CB11. Elevations range between 180 and 750 m (600 and 2500 ft).	CB1	Orthic Brown	w	-	-	Very gently to moderately sloping (less than 10% slopes).
		CB3	Orthic Brown	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		CB4	Orthic Brown	w	Orthic Dark Gray	w	Up to 40% inclusion of less common soil which has developed under mainly forested conditions.
		CB5	Orthic Brown	w	Lithic Brown	r	Up to 40% unclusion of less common soil which is <50 cm thick over bedrock.
		CB6	Lithic Brown	r	Rock Outcrops	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		CB7	Orthic Brown	w	Rego Brown	r	Up to 40% inclusion of less common soil developed on talus slopes.
		CB11	Orthic Brown	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soil which is due to cultivation.

CARSON SOILS (CS)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Restricted distribution in the vicinity of Pavilion Lake, Cache Creek, Upper Hat Creek, and Spences Bridge. *Seepage at the base of medium and long slopes may improve site productivity.	Gravelly loamy sand or gravelly sandy loam, moderately alkaline colluvial fan deposits associated with limestone bedrock. Generally moderately to extremely stony. A modal profile (Degraded Eutric Brunisol) described and sampled. Elevations range from 1050 to 1650 m (3500 to 5500 ft).	CS1	Degraded Eutric Brunisol	w	-	-	Strongly to very steep sloping (10-60% slopes).
		CS2	Degraded Eutric Brunisol	w	Calcareous Dark Gray	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		CS3	Degraded Eutric Brunisol	w	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to southerly aspects, upper elevations or combination.
		CS4	Degraded Eutric Bruinsol	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil occuring in grassland openings.
		CS5	Degraded Eutric Brunisol	w	Lithic Eutric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		CS6	Lithic Eutric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		CS7	Degraded Eutric Brunisol	r	Orthic Regosol	r	Up to 40% inclusion of less common soil which has developed in areas subject to mass wasting (talus).

CAVANAUGH SOILS [2] (CG)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Moderately extensive distribution, mainly on the steeper slopes along the Fraser, Thompson and Nicola rivers.	Gravelly loamy sand or gravelly sand, mildly to moderately alkaline colluvial and colluvial fan deposits associated with volcanic bedrock. Generally moderately to exceedingly stony. Elevations range from 240 to 900 m (800 to 3000 ft).	CG1	Degraded Eutric Brunisol	r	-	-	Moderately to extremely sloping (10 to over 60% slopes).
		CG2	Degraded Eutric Brunisol	r	Orthic Brown	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		CG3	Degraded Eutric Brunisol	r	Degraded Eutric Brunisol	w	Up to 40% inclusion of soil with similar morphology as the most common soil but which has developed under edaphically or climatically moister conditions. The soil has a more deeply weathered profile.
		CG4	Degraded Eutric Brunisol	r	Orthic Dark Gray, Orthic Dark Brown	r r	Up to 40% inclusion (in total) of less common soils which have developed mainly under grassland vegetation.
		CG5	Degraded Eutric Brunisol	r	Lithic Eutric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm deep over bedrock.

CAVANAUGH SOILS [2] (CG) (continued)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
		CG6	Lithic Eutric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm deep over bedrock. Up to 40% inclusion of rock outcrops.
		CG7	Degraded Eutric Brunisol	r	Orthic Regosol	r	Up to 40% inclusion of less common soil which has developed in areas of active mass wasting (talus).

CEDARBENCH SOILS (CZ)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Coastal Forest Region (Coastal Transition Section); Coastal western hemlock – western red cedar zone.	Gravelly sandy loam to gravelly sand, strongly acid, colluvial deposits associated with granitic bedrock. Generally excessively stony.	CZ1	Orthic Humo-Ferric Podzol	w,r	-	-	Strongly to very steeply sloping (10-60% slopes).
	A modal profile (Orthic Humo-Ferric Podzol) described and sampled.	CZ2	Orthic Humo-Ferric Podzol	w,r	Orthic Dystric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
Restricted to areas west and south of Lytton and in the Siska, Kwoiek, Siwhe and Stein valleys.		CZ3	Orthic Humo-Ferric Podzol	w,r	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has similar morphology but has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination. The soil is more deeply weathered.
*Seepage at base of slopes improves site productivity but may be a constraint to engineering uses.		CZ4	Orthic Humo-Ferric Podzol	w,r	Sombric Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation located in areas subject to avalanching.
		CZ7	Orthic Humo-Ferric Podzol	w,r	Orthic Regosol	r	Up to 40% inclusion of less common soil which has developed in areas subject to mass wasting (talus).

CHASM SOILS [2] (CM)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Very extensive distribution throughout the map area. The highest concentration of map units is along the Fraser River in the northwest portion of the map area. Other fairly extensive areas occur west of Spences Bridge and south of Nicola River. Other areas occur along the North and South Thompson valleys, on the southern portion of the Tranquille Plateau and in widely scattered locations on the steeper portions of the Thompson Plateau. *Seepage at the base of medium and long slopes may improve site productivity; especially in component CM3.	Sand to sandy loam, neutral to mildly alkaline colluvial and colluvial fan deposits associated with volcanic bedrock. Generally slightly to very stony. A modal profile (Degraded Eutric Brunisol) described and sampled. Elevations range from 900 to 1650 m (3000 to 5500 ft).	CM1	Degraded Eutric Brunisol	w	-	-	Moderately to extremely sloping (5 to over 60% slopes).
		CM2	Degraded Eutric Brunisol	w	Degraded Eutric Brunisol		Up to 40% inclusion of less common soil which is morphologically similar to the most common soil but has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		CM3	Degraded Eutric Brunisol	w	Orthic Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northern aspects, upper elevations or combination.
		CM4	Degraded Eutric Brunisol	w	Orthic Melanic Brunisol and/or Orthic Black	w	Up to 40% inclusions of less common soils (in total) which have mainly developed under grassland or deciduous vegetation.
		CM5	Degraded Eutric Brunisol	w	Lithic Eutric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm in depth over bedrock.
		CM6	Lithic Eutric Brunisol and/or Lithic Melanic Brunisol	r	Rock Outcrop	r	Most common soils are <50 cm deep over bedrock. Up to 40% inclusion of rock outcrops.
		CM7	Degraded Eutric Brunisol	w	Orthic Regosol	w	Up to 40% inclusion of less common soil which has developed in areas of active mass wasting (talus).
		CM12	Degraded Eutric Brunisol	w	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed in areas where the parent material is somewhat finer textured.

CHATAWAY SOILS (CY)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Restricted distribution, mostly south of Lillooet, and north of Lytton. *Seepage at base of slopes improves site productivity.	Gravelly sandy loam to gravelly coarse sand, acid to neutral colluvial deposits associated with granitic bedrock. Generally very to excessively stony. Elevations range from 1500 to 2100 m (5000 to 7000 ft).	CY1	Degraded Dystric Brunisol	w	-	-	Moderately to very steeply sloping (10-30% slopes).
		CY2	Degraded Dystric Brunisol	w	Orthic Dystric Brunisol		Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		CY3	Degraded Dystric Brunisol	w	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil developed under edphically or climatically moister conditions.
		CY4	Degraded Dystric Brunisol	w	Orthic Sombric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation.
		CY5	Degraded Dystric Brunisol	w	Lithic Dystric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		CY6	Lithic Dystric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrop.

CLAPPERTON SOILS (CP)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Moderately extensive distribution along the Fraser River north of Lytton, between Nicola Lake and Ashcroft, along Guichon Creek and Nicola River, in the Highland Valley and north of Nicola Lake towards Kamloops. *Seepage at the base of medium and long slopes may improve site productivity especially in component CP3.	Sandy loam to coarse sand, slightly acid to neutral, colluvial and colluvial fan deposits associated with granite bedrock. Generally very to excessively stony. Elevations range from 900 to 1650 m (3000 to 5500 ft).	CP1	Orthic Dystric Brunisol	w	-	-	Moderately to very steeply saloping (5-60% slopes).
		CP2	Orthic Dystric Brunisol	w	Degraded Eutric Brunisol	w,r	Up to 40% inclusion of less common soil which has developed under edaphically drier conditons. These may be due to southerly aspects, lower elevations or combination.
		CP3	Orthic Dystric Brunisol	w	Degraded Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		CP4	Orthic Dystric Brunisol	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has developed under grassland in forest openings.
		CP5	Orthic Dystric Brunisol	w	Lithic Dystric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		CP6	Lithic Dystric Brunisol	w	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		CP7	Orthic Dystric Brunisol	w	Orthic Regosal	r	Up to 40% inclusion of less common soil which has developed in areas of active mass wasting (talus).

CLEMSON SOILS (CW)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Limited distribution between the Fraser and Bonaparte rivers. *Seepage at the base of slopes improves site productivity.	Sand or loamy sand, acidic to basic colluvial fan deposits associated with limestone bedrock. Generally moderately to exceedingly stony. A modal profile (Orthic Humo-Ferric Podzol) described and sampled. Elevations range from 1650 to 2100 m (5500 to 7000 ft).	CW1	Orthic Humo-Ferric Podzol	w	-	-	Strongly to very steeply sloping (10-30% slopes).
		CW2	Orthic Humo-Ferric Podzol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditons. These may be due to southerly aspects, lower elevations or combination.
		CW4	Orthic Humo-Ferric Podzol	w	Orthic Melanic Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation.
		CW5	Orthic Humo-Ferric Podzol	w	Lithic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		CW6	Lithic Humo-Ferric Podzol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

COCHIWA SOILS (CV)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Coastal Forest Region (Coastal Transition Secton); Subalpine – Englemann spruce alpine fir zone. Not extensive; mostly along tributaries of the Nahalatach and Stein rivers, and along Kwoiek, Siska and Texas creeks. *Seepage at base of slopes improves site productivity but may be a constraint to engineering uses.	Gravelly sandy loam to gravelly sand, acidic colluvial deposits associated with granitic bedrock. Generally excessively stony. Elevations range from 1350 to 1800 m (4500 to 6000 ft).	CV1	Orthic Humo-Ferric Podzol	w	-	-	Strongly to very steeply sloping (10-60% slopes).
		CV2	Orthic Humo-Ferric Podzol	w	Degraded Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		CV3	Orthic Humo-Ferric Podzol	w	Gleyed Humo-Ferric Podzol	i	Up to 40% inclusion of less common soil which has developed due to edaphically or climatically moister conditions.
		CV4	Orthic Humo-Ferric Podzol	w	Sombric Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under mainly shrubs and forbs. These usually occur in exposed areas subject to avalanching.
		CV7	Orthic Humo-Ferric Podzol	w	Orthic Regosol	r	Up to 40% inclusion of less common soil which has developed in areas subject to mass wasting (talus).

COMMONAGE SOILS (CO)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Limited distribution; widely scattered from Spences Bridge to Merritt and near Kamloops.	Loamy sand or sand, neutral colluvial fan deposits associated with volcanic bedrock, Generally moderately to very stony. Elevations range from 750 to 1050 m (2500 to 3500 ft).	CO1	Orthic Dark Brown	w	-	-	Gently to strongly sloping (2-15% slopes). Vegetation is dominantly grass and shrub disclimax due to fire and grazing.
		CO2	Orthic Dark Brown	w	Orthic Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		CO3	Orthic Dark Brown	w	Orthic Black	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, elevations or combination.
		CO4	Orthic Dark Brown	w	Degraded Eutric Brunisol and/or Orthic Dark Gray	w w	Up to 40% inclusion (in total) of less common soils which have mainly developed under forested conditions.
		CO5	Orthic Dark Brown	w	Lithic Dark Brown	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		CO9	Orthic Dark Brown	w	Calcareous Dark Brown	w	Up to 40% inclusion of less common soil which is calcareous in the upper part.
		CO11	Orthic Dark Brown	w	Carbonated Black	w	Up to 40% inclusion of less common soil which has developed due to cultivation.

CONANT SOILS (CA)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Limited distribution, mainly in the vicinity of the Fraser River between Lytton and Lillooet.	Gravelly to very gravelly sandy loam to coarse sand, neutral to mildly alkaline colluvium associated with volcanic or metamorphic bedrock. Generally very to excessively stony. One modal profile (Degraded Eutric Brunisol) described and sampled. Elevations range between 300 and 900 m (1000 and 3000ft).	CA1	Degraded Eutric Brunisol	r	-	-	Gently to steeply sloping (3-30% slopes).
		CA2	Degraded Eutric Brunisol	r	Orthic Eutric Brunisol	r	Up to 40% inclusion of soils developed under drier conditions due to southerly aspect, lower elevations or combination.
		CA3	Degraded Eutric Brunisol	r	Orthic Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		CA4	Degraded Eutric Brunisol	r	Orthic Dark Gray	r	Up to 40% inclusion of less common soil that has developed under dominationtly grass and deciduous vegetation.
		CA5	Degraded Eutric Brunisol	r	Lithic Eutric Brunisol	r	Up to 40% inclusion of less common soil which is <50cm thick over bedrock.
		CA6	Lithic Eutric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		CA7	Degraded Eutric Brunisol	r	Orthic Regosol	r	Up to 40% inclusion of actively mass wasting colluvium (talus).
		CA11	Degraded Eutric Brunisol	r	Orthic Gray Luvisol	w	Up to 40% inclusion of soils developed on somewhat finer textured materials.

COURTNEY SOILS[2] (CT)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Bunchgrass zone. Not extensive; mainly at lower elevations along the Thompson River between Spences Bridge and Savona.	Sandy loam or loam, moderately alkaline, colluvial fan deposits associated with volcanic bedrock. Generally slightly to moderately stony. Sandy to silty eolian materials incorporated into surface of soil. Three profiles sampled and described, a modal profile (Orthic Brown) and two variant profiles (Calcareous Brown). Elevations range from 180 to 750 m (600 to 2500ft).	CT1	Orthic Brown	w	-	-	Gently to strongly sloping (2-15% slopes).
		CT2	Orthic Brown	w	Orthic Brown	w	Up to 40% inclusions of taxonomically similar less common soil which is less deeply weathered due to drier conditions.
		CT3	Orthic Brown	w	Orthic Dark Brown	w	Up to 40% inclusions of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		CT4	Orthic Brown	w	Orthic Dark Gray and/or Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soils which have developed under mainly forested conditions.
		CT5	Orthic Brown	w	Lithic Brown	r	Up to 40% inclusion of less common soil <50 cm in depth to bedrock.
		CT6	Lithic Brown	r	Rock Outcrop	r	Most common soil is <50 cm deep over bedrock. Up to 40% inclusion of rock outcrops.
		CT7	Orthic Brown	w	Orthic Regosol	w,r	Up to 40% inclusion of less common soil which has developed in areas of active mass wasting (talus).
		CT8	Orthic Brown	w	Rego Brown	w	Up to 40% inclusion of less common soil which has been affected by sheet, rill, and/or gully erosion.
		CT11	Orthic Brown	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soil which has developed due to cultivation.

CROWN MOUNTAIN SOILS (CN)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Limited distribution in the Hat Creek basin.	Sandy loam or loam, mildly to moderately alkaline, colluvial fan deposits associated with limestone bedrock. Generally moderately to excessively stony. One modal profile, (Calcareous Dark Gray) described and sampled. Elevations range from 750 to 1200 m (2500 to 4000 ft).	CN1	Calcareous Dark Gray	w	-	-	Strongly to very steeply sloping (10-60% slopes).
		CN2	Calcareous Dark Gray	w	Calcareous Dark Brown	w	Up to 40% inclusion of less common soil which has developed under drier conditions.
		CN3	Calcareous Dark Gray	w	Dark Gray Luvisol	w	Up to 40% inclusion of less common soil developed under climatically or edaphically moister conditions.
		CN4	Calcareous Dark Gray	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly forested conditions.
		CN5	Calcareous Dark Gray	w	Lithic Dark Gray	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		CN6	Lithic Dark Gray	w	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		CN11	Calcareous Dark Gray	w	Gleyed Dark Gray	i	Up to 40% inclusion of soil developed on finer textured materials with restricted drainage.

CURNOW SOILS (CX)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions: Coastal Forest Region (Coastal Transition Section); coastal western hemlock – western red cedar zone. Not extensive; mostly in the Nahatlatch and Kwoiek valleys. *Seepage at base of slopes improves site productivity but may be a constraint to engineering uses.	Gravelly sandy loam or gravelly loam, neutral colluvial deposits associated with metamorphic bedrock. Generally very to exceedingly stony. A modal profile (Degraded Eutric Brunisol) described and sampled. Elevations range from 750 to 1350 m (2500 to 4500 ft).	CX1	Degraded Eutric Brunisol	w	-	-	Strongly to very steeply sloping (10-60% slopes).
		CX2	Degraded Eutric Brunisol	w	Orthic Eutric Brunisol	w	Up to 40% inclusion of less common soil developed under drier conditions such as south aspects and lower elevations.
		CX3	Degraded Eutic Brunisol	w	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under edaphically moister conditions. These may be due to northerly aspects, upper elevation or combination.
		CX4	Degraded Eutric brunisol	w	Orthic Melanic Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation and often occurs in areas subject to avalanching.

DOMINIC SOILS (DN)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Very limited distribution along the North Thompson River *Component DN4, because of restricted drainage, may require artificial drainage to improve site productivity.	Fine sandy loam or silt loam, neutral fluvial deposits derived from a variety of bedrock. Stone-free. One variant profile (Carbonated Dark Brown) described and sampled. Elevations range from 330 to 600 m (110 to 2000 ft).	DN1	Degraded Eutric Brunisol	w	-	-	Nearly level to gently undulating (less than 2% slopes).
		DN4	Degraded Eutric Brunisol	w	Gleyed Eutric Brunisol	i	Up to 40% inclusion of less common soil which has restricted drainage.
		DN11	Degraded Eutric brunisol	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soil which has developed due to cultivation.

DUNLEAVY SOILS[1,3] (D)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest region; Interior Douglas-fir zone (without seral ponderosa pine). Very limited distribution in the north-east corner of the map area. *Fluctuating water tables in depressions (D3) increases site productivity in these areas.	Gravelly sandy loam or gravelly loamy sand fluvial deposits derived from a variety of bedrock. Generally moderately to very stony. Elevations range from 330 to 1050 m (1100 to 3500 ft).	D1	Degraded Eutric Brunisol	r	-	-	Undulating (2-5% slopes).
		D3	Degraded Eutric Brunisol	r	Orthic Regosol	m,i	Up to 40% inclusion of less common soil which is edaphically moister than usual, due to fluctuating water tables.
		D5	Degraded Eutric Brunisol	m,w	Lithic Degraded Eutric Brunisol	r	Up to 40% inclusion of less common soil <50 cm in depth to bedrock.

EUGENE SOILS[1,2] (EE)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Interior white spruce zone. Limited distribution on the Tranquille Plateau north of Rod Lake. *Seepage at base of slopes and in depressions improves site productivity.	Silt loam or silty clay loam morainal deposits associated with volcanic bedrock. Generally moderately to very stony. Elevations range from 1050 to 1350 m (3500 to 4500 ft).	EE1	Orthic Gray Luvisol	w	-	-	Moderately sloping to strongly rolling (5-30% slopes).
		EE2	Orthic Gray Luvisol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil developed under drier conditions such as south aspects and low elevations.
		EE3	Orthic Gray Luvisol	w	Podzolic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister condtions. These may be due to northerly aspects, upper elevations or combination.
		EE4	Orthic Gray Luvisol	w	Gleyed Gray Luvisol	i	Up to 40% inclusion of less common soil with restricted drainage developed under edaphically wetter conditions.
		EE5	Orthic Gray Luvisol	w	Lithic Gray Luvisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.

FLAT CREEK SOILS (FT)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Bunchgrass zone. Limited distribution between Kamloops and Tranquille. *Component FT4 may require artificial drainage to improve site productivity.	Sand to sandy loam, moderately alkaline fluvial deposits derived from a variety of bedrock. Stone-free. Elevations range from 330 to 600 m (1100 to 2000 ft).	FT1	Orthic Brown	w	-	-	Nearly level to gently undulating (less than 2% slopes).
		FT4	Orthic Brown	w	Gleyed Carbonated Regosol	i	Up to 40% inclusion of less common soil which has restricted drainage.
		FT11	Orthic Brown	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soil which has developed due to cultivation.

FLEET CREEK SOILS (FL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Limited distribution, mainly on the lower terraces along the North Thompson River. *Component FL*4*, because of water table fluctuation, may require drainage to improve site productivity.	Sand to sandy loam fluvial deposits derived from a variety of bedrock, mainly volcanic. Stone-free. A modal profile (Degraded Eutric Brunisol) sampled and described. Elevations range from 330 to 600 m (1100 to 2000 ft).	FL1	Degraded Eutric Brunisol	w	-	-	Nearly level to gently undulating (les than 2% slopes).
		FL4	Degraded Eutric Brunisol	w	Gleyed Regosol and/or Gleyed Cumulic Regosol	i,p	Up to 40% inclusion of less common soils which have restricted drainage.
		FL11	Degraded Eutric Brunisol	w	Carbonated Dark Brown	w	Up to 40% inclusions of less common soil which has developed due to cultivation.

FRANCES SOILS[2] (FS)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Riparian vegetation on edaphic sites. Not extensive; occurs along the Coldwater River near Merritt, along the upper Nicola River to Chapperon Lakes and along the Bonaparte and Deadman rivers. Most of this association is cultivated and component FS11 is the most common. *All components, due to fluctuating water tables, may require drainage to improve site productivity.	Sandy loam to silt loam, moderately alkaline fluvial deposits derived mainly from a variety of basic bedrock types. Stone-free. Elevations range from 300 to 750 m (1000 to 2500 ft).	FS1	Gleyed Cumulic Regosol	i	-	-	Gently undulating to gently rolling (less than 10% slopes).
		FS2	Gleyed Cumulic Regosol	i	Cumulic Regosol	w	Up to 40% inclusion of less common soil not affected by fluctuating water tables.
		FS3	Gleyed Cumulic Regosol	i	Rego Gleysol	p,i	Up to 40% inclusion of less common soil which is wetter.
		FS4	Gleyed Cumulic Regosol	i	Gleyed Saline Regosol	i,p	Up to 40% inclusion of less common, saline soil
		FS11	Gleyed Cumulic Regosol	i	Carbonated Black and/or Orthic Humic Regosol	w,m	Up to 40% inclusion of less common soils which have developed due to cultivation.

FRISKEN SOILS (FR)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Riparian vegetation on edaphic sites. Very limited distribution near Nicola Lake and south of Minnie Lake. *All components, due to fluctuating water tables, may require artificial drainage to improve site productivity.	Sandy loam to silt loam, alkaline, fluvial deposits derived from a variety of basic bedrock. Stone-free. A modal profile (Gleyed Saline Regosol) sampled and described. Elevations range from 300 to 750 m (1000 to 2500 ft).	FR1	Gleyed Saline Regosol	i	-	-	Gently undulating to gently rolling (less than 10% slopes).
		FR11	Gleyed Saline Regosol	i	Gleyed Carbonated Black	i	Up to 40% inclusion of less common soils which have developed due to cultivation.

GISBORNE SOILS (GN)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir (without seral ponderosa pine). Very extensive distribution, mainly in the Highland Valley, east and west of Guichon Creek, and near Heffley, Pennask and Dardanelles lakes . * Seepage at the base of the short slopes or emerging on terraced landforms from shedding upslope locations improves site productivity but presents a constraint to engineering uses.	Gravelly to very gravelly sandy loam to sand, neutral fluvioglacial deposits derived from a variety of bedrock, mainly volcanic. Generally moderately to very stony. A modal profile (Degraded Eutric Brunisol) described and sampled. Elevations range from 1000 to 1650 m (3000 to 5500 ft).	GN1	Degraded Eutric Brunisol	r,w	-	-	Very gently sloping to moderately rolling (less than 15% slopes).
		GN2	Degraded Eutric Brunisol	r,w	Degraded Eutric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations, or combination. The profile is shallower and correlates with the Glossey soil association.
		GN3	Degraded Eutric Brunisol	r,w	Orthic Humo-Ferric Podzol and/or Degraded Dystric Brunisol	w w	Up to 40% inclusions (in total) of less common soils which have developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		GN4	Degraded Eutric Brunisol	r,w	Orthic Dark Gray	r,w	Up to 40% inclusion of less common soil which has developed under vegetation containing significant grasses and forbs.
		GN11	Degraded Eutric Brunisol	r,w	Carbonated Black and/or Melanic Brunisol	w	Up to 40% inclusions of less common soils which have developed due to cultivation.

GLIMPSE SOILS (GS)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Fairly extensive distribution, somewhat widely scattered. Largest concentration is between Knutsford, Trapp and Napier lakes, and between Nicola, Douglas and Minnie lakes. Also occurs in the Nicola and Hat Creek valleys.	Sand or loamy sand, mildly to moderately alkaline, fluvio-glacial deposits derived from a variety of bedrock. Generally moderately to very stony. Elevations range from 750 to 1050 m (2500 to 3500 ft).	GS1	Orthic Dark Brown	r,w	-	-	Very gently sloping to gently rolling (less than 10% slopes). Vegetation is dominated by grass and shrub disclimax due to fire and grazing.
		GS2	Orthic Dark Brown	r,w	Orthic Brown	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		GS3	Orthic Dark Brown	r,w	Orthic Black	r,w	Up to 40% inclusion of less common soil which developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		GS4	Orthic Dark Brown	r,w	Degraded Eutric Brunisol and/or Orthic Dark Gray	r,w	Up to 40% inclusion (in total) of less common soils which have developed under partially forested conditions.
		GS8	Orthic Dark Brown	r,w	Rego Dark Brown	r	Up to 40% inclusion of less common soil which is affected by sheet, rill and/or gully erosion
		GS9	Orthic Dark Brown	r,w	Calcareous Dark Brown	r	Up to 40% inclusion of less common soil which is strongly alkaline.
		GS11	Orthic Dark Brown	r,w	Carbonated Black	w	Up to 40% inclusion of less common soil which is due to cultivation.

GLOSSEY SOILS (GY)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Moderately extensive distribution in the Guichon, Nicola, Thompson and Fraser valleys.	Gravelly sandy loam to gravelly silt loam overlaying sand or loamy sand, neutral to basic fluvioglacial deposits derived from a variety of bedrock, mainly volcanic. Generally moderate to very stony. Elevations range from 180 to 900 m (600 to 3000 ft).	GY1	Degraded Eutric Brunisol	r,w	-	-	Very gently sloping to moderately rolling (less than 15% slopes).
		GY2	Degraded Eutric Brunisol	r,w	Orthic Brown	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		GY3	Degraded Eutric Brunisol	r,w	Degraded Eutric Brunisol*	w	Up to 40% inclusion of taxonomically similar less common soil which developed under edaphically or climatically moister conditions. These may be due to northerly aspects, elevations or combination. The profile is deeper and correlates with the Gisborne soil association.
		GY4	Degraded Eutric Brunisol	r,w	Orthic Dark Gray	r	Up to 40% inclusion of less common soil which has developed under partially forested conditions.
		GY9	Degraded Eutric Brunisol	r,w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which is slightly alkaline or saline.
		GY11	Degraded Eutric Brunisol	r,w	Carbonated Dark Brown and/or Melanic Brunisol	w	Up to 40% inclusion of less common soil which has developed due to cultivation.

GODEY SOILS (GD)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Bunchgrass zone. Fairly extensive distribution along the Fraser River from Lytton to Lillooet and along the Thompson River from Ashcroft to Kamloops.	Sandy loam to loamy sand overlying gravelly sandy loam to gravelly coarse sand, moderately alkaline, fluvio-glacial deposits derived from a variety of bedrock, mainly volcanic. Generally slightly stony near the surface and very stony and gravelly at depth. A variable thickness of eolian veneer is common as a surface capping. Three modal profiles (Orthic Brown) sampled and described. Elevations range from 200 to 750 m (600 to 2500 ft).	GD1	Orthic Brown	r	-	-	Very gently sloping to gently rolling (less than 10% slopes).
		GD2	Orthic Brown	r	Orthic Brown	r	Up to 40% inclusion of taxomonically similar but less deeply weathered less common soil which has developed under edaphically or climatically drier conditions.
		GD3	Orthic Brown	r	Orthic Dark Brown	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		GD4	Orthic Brown	r	Orthic Dark Gray, Degraded Eutric Brunisol	r	Up to 40% inclusion (in total) of less common soils which have mainly developed under forested conditions.
		GD5	Orthic Brown	r	Lithic Brown	r	Up to 40% inclusion of less common soil which is <50 cm in depth over bedrock.
		GD8	Orthic Brown	r	Rego Brown	r	Up to 40% inclusion of less common soil which is affected by sheet, rill, and/or gully erosion.
		GD9	Orthic Brown	r	Solonetzic Brown	r	Up to 40% inclusion of less common soil which is alkaline or saline.
		GD11	Orthic Brown	r	Carbonated Dark Brown	r	Up to 40% inclusion of less common soil which has developed due to cultivation.

GORGE CREEK SOILS (GG)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Very limited distribution, mostly near Gnawed Mountain and east of the Guichon Valley. *Seepage at the base of short slopes, or emerging on terraced landforms from shedding, upslope locations improves site productivity, but presents a constraint to engineering uses.	Gravelly to very gravelly coarse sand to sandy loam, medium acid, fluvio-glacial deposits derived from a variety of bedrock, mainly volcanic and granitic. Generally very to excessively stony or gravelly. One variant profile (Degraded Dystric Brunisol) sampled and described. Elevations range from 1500 to 1950 m (5000 to 6500 ft).	GG1	Orthic Humo-Ferric Podzol	w	-	-	Undulating to strongly rolling (5-30% slopes).
		GG2	Orthic Humo-Ferric Podzol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.

GWENN SOILS (GW)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with or without seral ponderosa pine). Limited distribution, mostly near Douglas Lake.	Gravelly loamy sand to silt loam over sand or loamy sand, neutral fluvioglacial deposits derived from a variety of bedrock, mainly volcanic and granitic. Generally moderately to very stony. Elevations range from 1000 to 1500 m (3000 to 4500 ft).	GW1	Orthic Black	w	-	-	Very gently sloping to gently rolling (less than 10% slopes). Vegetation is dominated by grass and shrub dis-climax due to fire and grazing.
			Orthic Black	w			
		GW2	Orthic Black	w	Orthic Dark Brown	r,w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		GW3	Orthic Black	w	Orthic Black	w	Up to 40% inclusion of less common soil which has developed under climatically wetter conditions, resulting in deeper Ah horizons.
		GW4	Orthic Black	w	Degraded Eutric Brunisol and/or Degraded Dystric Brunisol	w	Up to 40% inclusion (in total) of less common soils which have developed under mainly forested conditions.
		GW9	Orthic Black	w	Calcareous Black	w,i	Up to 40% inclusion of less common soil which is alkaline and cultivated.
		GW11	Orthic Black	w	Carbonated Black	w	Up to 40% inclusion of less common soil which is due to cultivation.

HALLAMORE SOILS[1] (HA)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Shuswap Highland Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann spruce-alpine fir zone. Very limited occurrence near the northeast corner of the map area.	Sandy loam or loamy sand colluvial deposits associated with basic bedrock areas. Generally very to excessively stony. Elevations range from 1350 to 1650 m (4500 to 5500 ft).	HA5	Orthic Humo-Ferric Podzol	w	Lithic Humo-Ferric Podzol	r	Strongly to very steeply sloping (10-60% slopes). Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.

HELMCKEN SOILS[1] (HN)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann spruce - alpine fir zone. Limited distribution on the Tranquille Plateau. *Seepage at base of slopes and in depressions improves site productivity.	Sandy loam or loamy sand colluvial deposits associated with basic volcanic and metamorphic bedrock. Generally very to excessively stony. Elevations range from 1350 to 1650 m (4500 to 5500 ft).	HN1	Orthic Humo-Ferric Podzol	w	-	-	Strongly to very steeply sloping (10-60% slopes).
		HN2	Orthic Humo-Ferric Podzol	w	Degraded Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		HN5	Orthic Humo-Ferric Podzol	w	Lithic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		HN6	Lithic Humo-Ferric Podzol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

HEMP SOILS[1,3] (H)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Very limited distribution in the northeast portion of the map area.	Sandy loam or loamy sand colluvial deposits associated with basic volcanic and metamorphic bedrock. Generally very to excessively stony. Elevations range from 330 to 1050 m (1100 to 3500 ft).	H1	Degraded Eutric Brunisol	r	-	-	Strongly to very steeply sloping (10-60% slopes).
		H3	Degraded Eutric Brunisol	r	Degraded Eutric Brunisol	r	Up to 40% inclusion of taxonomically similar less common soil which has deeper profile development.
		H6	Lithic Eutric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

HOLDEN SOILS[2] (HD)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Limited distribution west and north of Hat Creek. *Seepage at base of short slopes may improve site productivity.	Gravelly or very gravelly sandy loam or loam overlying sand or loamy sand, basic fluvioglacial deposits derived from a vareity of bedrock, mainly limestone. Generally moderately to very stony. Elevations range from 1050 to 1650 m (3500 to 5500 ft).	HD1	Degraded Eutric Brunisol	w	-	-	Very gently sloping to moderately rolling (less than 15% slopes).
		HD2	Degraded Eutric Brunisol	w	Degraded Eutric Brunisol	w,r	Up to 40% inclusion of taxonomically similar less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination. The less common soil is less deeply weathered.
		HD3	Degraded Eutric Brunisol	w	Degraded Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		HD4	Degraded Eutric Brunisol	w	Calcareous Dark Gray	w	Up to 40% inclusion of less common soil which has developed under mixed grass and open forest vegetation.
		HD5	Degraded Eutric Brunisol	w	Lithic Eutric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm in depth over bedrock.

HOOLIGAN SOILS[1,3] (HO)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Limited distribution, mainly north of Heffley Lake and west of North Thompson River. *Seepage at the base of slopes improves site productivity.	Sandy loam or loamy sand colluvial deposits associated with basic volcanic and metamorphic bedrock. Generally very to excessively stony. Elevations range from 1050 to 1350 m (3500 to 4500 ft).	HO1	Degraded Dystric Brunisol	r	-	-	Strongly to very steeply sloping (10-60% slopes).
		HO2	Degraded Dystric Brunisol	r	Degraded Eutric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		HO3	Degraded Dystric Brunisol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		HO4	Degraded Dystric Brunisol	r	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil developed on finer textured parent materials.
		HO5	Degraded Dystric Brunisol	r	Lithic Dystric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		HO6	Lithic Dystric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

HOTFISH SOILS[1] (HH)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior white spruce zone. Very limited distribution in the upper Deadman River Valley. *Seepage at base of slopes improves site productivity.	Sandy loam or loamy sand colluvial deposits associated with basic volcanic and metamorphic bedrock. Generally very to excessively stony. Elevations range from 750 to 1050 m (2500 to 3500 ft).	HH1	Degraded Eutric Brunisol	w,r	-	-	Strongly to very steeply sloping (10-60% slopes).

INKITSAPH SOILS (IT)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Coastal Forest Region (Coastal Transition Section); Coastal western hemlock – western red cedar zone. Limited distribution in the Mowhokam Valley of the Cascade Mountains. *Seepage from adjacent slopes improves site productivity, but may constrain engineering uses.	Sand or loamy sand, strongly to medium acid fluvioglacial deposits derived from mainly metamorphic bedrock. Generally moderately to exceedingly stony. A modal profile (Gleyed Dystric Brunisol) sampled and Described. Elevations range from 300 to 750 m (1000 to 2500 ft).	IT1	Degraded Dystric Brunisol	r	-	-	Moderately to steeply sloping (5-30% slopes).
		IT3	Degraded Dystric Brunisol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		IT4	Degraded Dystric Brunisol	r	Orthic Sombric Brunisol	r	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation.

INKOIKO SOILS (IK)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Coast Mountains Physiographic Region; Coastal Forest Region (Coastal Transition Section); Coastal western hemlock – western red cedar zone. Very limited distribution in the Nahatlatch and Stein River valleys.	Sand or loamy sand, slightly acid fluvioglacial deposits derived from a variety of bedrock, mainly granitic. Generally excessively stony. Elevations range from 750 to 1350 m (2500 to 4500 ft).	IK1	Degraded Dystric Brunisol	r	-	-	Moderately to steeply sloping (5-30% slopes).
		IK2	Degraded Dystric Brunisol	r	Degraded Eutric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		IK3	Degraded Dystric Brunisol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil developed under climatically moister conditions, such as northerly aspects and/or upper elevations.

IZMAN CREEK SOILS (IZ)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Not extensive distribution; occurs along the Fraser Canyon south of Lytton and in the lower Stein River valley. *Seepage from adjacent slopes may improve site productivity.	Sand to loam over- lying coarse sand, slightly acid to neutral fluvioglacial deposits derived from a variety of bedrock, mainly granitic. Generally very to exceedingly stony. A thin surface capping of eolian material is common. A modal profile (Degraded Eutric Brunisol) sampled and described. Elevations range from 180 to 750 m (600 to 2500 ft).	IZ1	Degraded Eutric Brunisol	r	-	-	Gently to moderately sloping (2-10% slopes).
		IZ2	Degraded Eutric Brunisol	r	Orthic Eutric Brunisol	w,r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		IZ3	Degraded Eutric Brunisol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.

KANAKA SOILS (KK)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic regions; Dry Interior Forest Region; Interior Douglas-fir zone (wtih seral ponderosa pine). Not extensive distribution; occurs south of Lytton along the Fraser Canyon. *Shallow depth to bedrock is a major constraint to engineering uses.	Loam or sandy loam, medium acid, shallow colluvial deposits overlying metamorphic bedrock. Generally exceedingly rocky. A modal profile (Degraded Dystric Brunisol) described and sampled. Elevations range from 180 to 750 m (600 to 2500 ft).	KK1	Degraded Dystric Brunisol	r	-	-	Very steeply sloping to very hilly (30 to over 60% slopes). Modal soil is between 50 and 100 cm deep over bedrock.
		KK3	Degraded Dystric Brunisol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combinaiton.
		KK5	Degraded Dystric Brunisol	r	Lithic Dystric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		KK6	Lithic Dystric Brunisol	r	Rock Outcrop		Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

KERR SOILS[2] (KK)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic regions; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone (krummholz subzone).	Sandy loam or loam, slightly acid colluvial deposits associated with limestone bedrock. Generally very to excessively stony.	KR1	Orthic Melanic Brunisol	w	-	-	Strongly sloping to hilly (9-15% slopes).
		KR4	Orthic Melanic Brunisol	w	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under mainly forested conditions.
	A variant profile (Lithic Melanic Brunisol) described and sampled.						Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
Very limited distribution; mainly near Pavillion Mountain.		KR5	Orthic Melanic Brunisol	w	Lithic Melanic Brunisol	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
	Elevations range from 1950 to 2195 m (6500 to 7200 ft).	KR6	Lithic Melanic Brunisol	r	Rock Outcrop		

KHA LAKE (KH)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Coastal Forest Region (Coastal Transition Section); coastal western hemlock – western red cedar zone.	Loam or sandy loam, acidic to neutral shallow colluvial deposits overlying metamorphic bedrock. Generally exceedingly stony and moderately to exceedingly rocky.	KH1	Orthic Humo-Ferric Podzol	r	-	-	Very steeply sloping to very hilly (30 to over 60% slopes). Modal soil is between 50 and 100 cm deep over bedrock.
		KH2	Othic Humo-Ferric Podzol	r	Orthic Dystric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically of climatically drier conditons. These may be due to southerly aspects, lower elevations or combination.
Very limited distribution west and south of Lytton.	Elevations range from 750 to 1350 m (2500 to 4500 ft).	KH3	Orthic Humo-Ferric Podzol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of taxonomically similar but more deeply weathered less common soil which has developed under edaphically or climatically moister conditons. These may be due to northerly aspects, upper elevations or combination.
*Localized seepage may improve site productivity; shallow depth to bedrock is a major constraint to engineering uses.		KH5	Orthic Humo-Ferric Podzol	r	Lithic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.

KLEPT LAKE (KP)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Coastal Forest Region (Coastal Transition Section); Subalpine Englemann spruce – alpine fir zone. Limited distribution south of Texas Creek. *Localized seepage will improve site productivity. Shallow depth to bedrock is a major constraint to engineering uses.	Loam or sandy loam, acidic to neutral shallow colluvial deposits overlying metamorphic bedrock. Generally exceedingly stony and moderately to exceedingly rocky. Elevations range from 1350 to 1800 m (4500 to 6000 ft).	KP1	Orthic Humo-Ferric Podzol	r	-	-	Very steeply sloping to very hilly (30 to over 60% slopes). Modal soil is between 50 and 100 cm deep over bedrock.
		KP3	Orthic Humo-Ferric Podzol	r	Orthic Ferro-Humic Podzol	r	Up to 40% inclusion of less comon soil which has developed under edaphically or climatically wetter conditons. These may be due to north aspects, higher elevations or combination.
		KP4	Orthic Humo-Ferric Podzol	r	Sombric Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which has mainly developed under shrub and forb vegetation in areas subject to exposure and/or avalanching.
		KP5	Orthic Humo-Ferric Podzol	r	Lithic Humo-Ferric Podzol	r	Less common soil is <50 cm thick over bedrock.
		KP6	Lithic Humo-Ferric Podzol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

KLOWA CREEK SOILS (KL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Coastal Forest Region (Coastal Transition Section); Coastal western hemlock – western red cedar zone. Fairly extensive distribution south of Texas Creek and southeast of Lytton. *Localized seepage may improve site productivity. Shallow depth to bedrock is a major constraint to engineering uses.	Sandy loam to sand, acidic to neutral shallow colluvial deposits overlying granitic bedrock. Generally excessively stony and moderately to exceedingly rocky. Elevations range from 750 to 1350 m (2500 to 4500 ft).	KL1	Orthic Humo-Ferric Podzol	r	-	-	Very steeply sloping to very hilly (30 to over 60% slopes). Modal soil is between 50 and 100 cm deep over bedrock.
		KL2	Orthic Humo-Ferric Podzol	r	Orthic Dystric Brunisol	r	Up to 40% inclusion of less comon soil which has developed under edaphically or climatically drier conditons. These may be due to southerly aspects, lower elevations or combination.
		KL3	Orthic Humo-Ferric Podzol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of taxonomically similar but more deeply weathered less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination. Less common soil is similar to the most common soil of the Kumkan association.
		KL5	Orthic Humo-Ferric Podzol	r	Lithic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		KL6	Lithic Humo-Ferric Podzol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusions of rock outcrops

KUMKAN SOILS (KM)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Coastal Forest Region (Coastal Transition Section); Subalpine Englemann spruce – alpine fir zone. Fairly extensive distribution south of Texas Creek and west of the Fraser River, also southeast of Lytton within the Cascade Mountains. *Localized seepage improves site productivity. Shallow depth to bedrock is a major constraint to engineering uses.	Sandy loam to sand, acidic to neutral shallow colluvial deposits overlying granitic bedrock. Generally excessively stony and moderately to exceedingly rocky. Elevations range from 1350 to 1800 m (4500 to 6000 ft).	KM1	Orthic Humo-Ferric Podzol	r	-	-	Very steeply sloping to very hilly (30 - over 60% slopes). Modal soil is between 50 and 100 cm deep over bedrock.
		KM2	Orthic Humo-Ferric Podzol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of taxonomically similar but less deeply weathered less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination. Less common soil is similar to the modal of the Klowa Creek association.
		KM3	Orthic Humo-Ferric Podzol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of taxonomically similar but more deeply weathered less common soil. These may be due to moister conditions such as higher elevations, north aspects or a combinaiton.
		KM4	Orthic Humo-Ferric Podzol	r	Sombric Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which has developed mainly under shrub and forb vegetation in areas subject to exposure and/or avalanching.
		KM5	Orthic Humo-Ferric Podzol	r	Lithic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		KM6	Lithic Humo-Ferric Podzol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

KWOIEK SOILS (KW)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa lpine). Limited distribution, mainly in the Stein and Kwoiek valleys and along the Fraser River south of Lytton. *Localized seepage may improve site productivity. Shallow depth to bedrock is a constraint to engineering uses.	Sandy loam to sand, acidic to neutral shallow colluvial deposits overlying granitic bedrock. Generally excessively stony and moderately to exceedingly rocky. Elevations range from 180 to 750 m (600 to 2500 ft).	KW1	Degraded Dystric Brunisol	r	-	-	Very steeply sloping to very hilly (30 - over 60% slopes). Modal soil is between 50 and 100 cm deep over bedrock.
		KW2	Degraded Dystric Brunisol	r	Degraded Eutric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		KW3	Degraded Dystric Brunisol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		KW5	Degraded Dystric Brunisol	r	Lithic Dystric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		KW6	Lithic Dystric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

LAC DU BOIS SOILS (LD)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Limited distribution between Merritt and Nicola Lake and east of Campbell Lake.	Silty clay loam to loam, strongly alkaline, weakly saline, lacustrine deposits. Stone-free. A modal profile (Solonetzic Dark Brown) described and sampled. Elevations range from 300 to 750 m (1000 to 2500 ft).	LD1	Solonetzic Dark Brown	w	-	-	Gently undulating to gently rolling (less than 10% slopes). Vegetation is dominated by grasses and shrubs.
		LD2	Solonetzic Dark Brown	w	Orthic Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditons at the lower elevations.
		LD3	Solonetzic Dark Brown	w	Solonetzic Black	w	Up to 40% inclusion of less common soil which has developed under edaphically moister conditions such as higher elevations or northerly aspects.
		LD4	Solonetzic Dark Brown	w	Solodic Dark Brown	w	Up to 40% inclusion of less common soil in which pedogenic processes have advanced more than usual.
		LD11	Solonetzic Dark Brown	w	Solonetzic Dark Brown	w	Up to 40% inclusion of less common soil which is cultivated.

LALUWISSEN SOILS (LS)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Limited distribution, mostly near Quilchena Creek and between Trapp and Nicola lakes.	Silt loam or silty clay loam, moderately to strongly alkaline lacustrine deposits. Stone-free. Elevations range from 850 to 1160 m (2800 to 3800 ft).	LS1	Orthic Dark Brown	w	-	-	Gently undulating to gently rolling (less than 10% slopes). Vegetation is dominated by grass and shrub disclimax due to fire and grazing.
		LS2	Orthic Dark Brown	w	Orthic Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditons. These may be due to southerly aspects, lower elevations or combination.
		LS3	Orthic Dark Brown	w	Orthic Black	w	Up to 40% inclusion of less common soil which has developed under moister conditions such as north aspects, higher elevations or both.
		LS4	Orthic Dark Brown	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly forested conditions.
		LS8	Orthic Dark Brown	w	Rego Dark Brown	w	Up to 40% inclusion of less common soil which has been affected by sheet, rill and/or gully erosion.
		LS9	Orthic Dark Brown	w	Saline Dark Brown	w	Up to 40% inclusion of less common soil which is saline.
		LS11	Orthic Dark Brown	w	Carbonated Black	w	Up to 40% inclusion of less common soil which has developed due to cultivation.

LAUREL SOILS[1] (LL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Englemann spruce – alpine fir zone. Limited distribution along Jamieson Creek in the North Thompson River drainage.	Sandy loam to gravelly sand fluvioglacial deposits derived from a variety of bedrock. Generally moderately to exceedingly stony. Elevations range from 1350 to 1650 m (4500 to 5500 ft).	LL1	Orthic Humo-Ferric Podzol	r	-	-	Gently sloping or undulating (2-5% slopes).
		LL3	Orthic Humo-Ferric Podzol	r	Orthic Humo-Ferric Podzol	r	Up to 40% inclusion of taxonomically similar but more deeply weathered less common soil which has developed under edaphically or climatically moister conditons. These may be due to northerly aspects or higher elevations or a combination.

LUNDBOM SOILS (LM)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Bunchgrass zone. Limited distribution, mainly along the South Thompson River between Spences Bridge and Ashcroft, and near Merritt.	Silty clay loam or clay loam, moderately to strongly alkaline lacustrine deposits. Stone-free. A modal profile (Orthic Brown) was described and sampled. Elevations range from 200 to 730 m (700 to 2400 ft).	LM1	Orthic Brown	w	-	-	Gently undulating to gently rolling (less than 10% slopes).
		LM2	Orthic Brown	w	Orthic Brown	w	Up to 40% inclusion of taxonomically similar but less deeply weathered less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects or lower elevations or a combination.
		LM3	Orthic Brown	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditons. These may be due to northerly aspects, upper elevations or combination.
		LM4	Orthic Brown	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly forested conditions.
		LM8	Orthic Brown	w	Rego Brown	r	Up to 40% inclusion of less common soil that has been affected by sheet, rill and/or gully erosion.
		LM11	Orthic Brown	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soil which has developed due to cultivation.

MAIDEN (MD)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Fairly extensive distribution, mainly north and south of Kamloops, west of the Bonaparte River, and west and north of Spences Bridge.	Silt loam or silty clay loam, moderately alkaline, morainal deposits associated with basic volcanic and limestone bedrock. Generally slightly to moderately stony. A modal profile (Degraded Eutric Brunisol) described and sampled. Elevations range from 450 to 10550 m (1500 to 3500 ft).	MD1	Degraded Eutric Brunisol	w	-	-	Moderately rolling to hilly (10-60% slopes).
		MD2	Degraded Eutric Brunisol	w	Orthic Dark Brown, Orthic Dark Gray	w w	Up to 40% inclusions (in total) of less common soils that have developed under mostly grassland vegetation in edaphically or climatically drier locations. These may be due to southerly aspects, lower elevations or combination.
		MD3	Degraded Eutric Brunisol	w	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditons. These may be due to northerly aspects, higher elevations or combination.
		MD4	Degraded Eutric Brunisol	w	Calcareous Black	w	Up to 40% inclusion of less common soil which has developed under mainly grass and shrub vegetation.
		MD5	Degraded Eutric Brunisol	w	Lithic Eutric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		MD6	Lithic Eutric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

MCKNIGHT SOILS (MG)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Bunchgrass zone. Fairly extensive distribution, mainly near Ashcroft and south towards Spences Bridge; also occurs on south aspects along the South Thompson River and north of Kamloops.	Loam or silt loam, moderately alkaline and weakly saline morainal deposits associated with basic volcanic and limestone bedrock. Generally slightly to moderately stony. An eolian veneer of variable thickness is generally present at the surface. A modal profile (Orthic Brown) described andsampled. Elevations range from 300 to 600 m (1000 to 2000 ft).	MG1	Orthic Brown	w	-	-	Gently sloping to strongly rolling (5-305 slopes).
		MG3	Orthic Brown	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		MG4	Orthic Brown	w	Orthic Dark Gray	w	Up to 40% inclusion of less common soil which has developed under mixed forest and grass vegetation.
		MG5	Orthic Brown	w	Lithic Brown	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		MG6	Lithic Brown	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		MG8	Orthic Brown	w	Rego Brown	w	Up to 40% inclusion of less common soil which has been affected by sheet, rill and/or gully erosion.
		MG9	Orthic Brown	w	Saline Dark Brown	w,m	Up to 40% inclusion of less common soil which is affected by saline seepage.

MCLAREN SOILS (ML)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas- fir zone (without seral ponderosa Pine). Moderately extensive distribution, mainly east and north of Hat Creek. *Seepage at base of slopes improves site productivity but may also increase calcareousness.	Gravelly sandy loam or gravelly loam, neutral to moderately alkaline morainal deposits associated with basic volcanic and limestone bedrock. Generally slightly to very stony. A modal proflie (Orthic Gray Luvisol) described and sampled. Elevations range from 1050 to 1650 m (3500 to 5500 ft).	ML1	Orthic Gray Luvisol	w	-	-	Moderately rolling to steeply sloping (10-30% slopes).
		ML2	Orthic Gray Luvisol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditons. These may be due to southerly aspects, lower elevations or combination.
		ML3	Orthic Gray Luvisol	w	Orthic Gray Luvisol	w	Up to 40% inclusion of taxonomically similar, but more deeply weathered less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		ML4	Orthic Gray Luvisol	w	Calcareous Black	w	Up to 40% inclusion of less common soil that has mainly developed under grass and forb vegetation.
		ML5	Orthic Gray Luvisol	w	Lithic Gray Luvisol	r	Up to 40% inclusion of less common soil which is <50cm thick over bedrock.
		ML9	Orthic Gray Luvisol	w	Solonetzic Gray Luvisol	w	Up to 40% inclusion of less common soil which is alkaline or saline.

MCQUEEN SOILS (MQ)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with ponderosa pine). Fairly extensive distribution, mostly north and south of Kamloops and west and north of Ashcroft. *Seepage at base of slopes and in depressions improves site productivity but may increase salinity or alkalinity.	Silt loam or silty clay loam, moderately alkaline morainal deposits associated with basic volcanic and limestone bedrock. Generally slightly stony. A modal profile (Orthic Dark Brown) described and sampled. Elevations range from 450 to 950 m (1500 to 3000 ft).	MQ1	Orthic Dark Brown	w	-	-	Gently sloping to strongly rolling (5-30% slopes). Vegetation is dominated by grass and shrub disclimax due to fire and grazing.
		MQ2	Orthic Dark Brown	w	Orthic Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditons. These may be due to southerly aspects, lower elevations or combination.
		MQ3	Orthic Dark Brown	w	Orthic Black	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditons. These may be due to northerly aspects, upper elevations or combination.
		MQ4	Orthic Dark Brown	w	Orthic Dark Gray and/or Degraded Eutric Brunisol	w w	Up to 40% inclusions (in total) of less common soils which have developed under mainly forested conditions.
		MQ5	Orthic Dark Brown	w	Lithic Dark Brown and/or Lithic Eutric Brunisol	r r	Up to 40% inclusion (in total) of less common soils which are <50 cm thick over bedrock.
		MQ6	Lithic Dark Brown and/or Lithic Eutric Brunisol	r r	Rock Outcrop	r	Most common soils are <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		MQ8	Orthic Dark Brown	w	Rego Dark Brown	r	Up to 40% inclusion of less common soil which are affected by sheet, rill and/or gully erosion.
		MQ9	Orthic Dark Brown	w	Calcareous and/or Saline Dark Brown	w,m	Up to 40% inclusion (in total) of less common soils which are affected by saline and/or alkaline seepage.
		MQ10	Orthic Dark Brown	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soil which has developed due to cultivation.
		MQ11	Orthic Dark Brown	w	Carbonated Black	w	Up to 40% inclusion of less common soil which has developed due to cultivation.

MEANDER SOILS (MA)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Very limited distribution; only occurs as secondary association in map units.	Silt loam to clay loam, basic (moderately to strongly calcareous)morainal deposits associated with basic volcanic and limestone bedrock. Generally slightly stony. Elevations range from 1160 to 1280 m (3800 to 4200 ft).	MA1	Orthic Black	w	-	-	Gently sloping to strongly rolling topography (5-30% slopes). Vegetation is dominated by grass and shrub disclimax due to fire and grazing.

MEDICINE SOILS (MC)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir (with seral ponderosa pine). Restricted distribution; occurs mainly near Hat Creek. *Seepage at base of slopes and in swales of hilly topography is moderately to highly clacareous.	Loam or sandy loam, mildly to strongly alkaline, morainal deposits associated with basic volcanic and limestone bedrock. Generally slightly to moderately stony. A modal profile (Calcareous black) was described and sampled. Elevations range from 450 to 1140 m (1500 to 3750 ft).	MC1	Calcareous Black	w	-	-	Moderately rolling to hilly (10-60% slopes). Vegetation is dominated by grass and shrubs due to fire, grazing and strong alkalinity.
		MC2	Calcareous Black	w	Calcareous Dark Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		MC4	Calcareous Black	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed mainly under forested conditions.
		MC5	Calcareous Black	w	Lithic Black	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		MC8	Calcareous Black	w	Calcareous Regosol	w	Up to 40% inclusion of less common soil which has been affected by sheet, rill and/or gully erosion.
		MC9	Calcareous Black	w	Carbonated Rego Black	w,i	Up to 40% inclusion of less common soil which has developed due to calcareous seepage.
		MC10	Calcareous Black	w	Carbonated Rego Black	w,i	Up to 40% inclusion of less comon soil which has developed due to sheet or rill erosion and calcareous seepage.

MELLIN SOILS (ME)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physoigraphic Regions; Dry Interoir Forest Region; Subalpine Englemann spruce – alpine fir zone. Not extensive distribution; occurs mainly south of Pavillion Lake and west of Guichon Creek. *Seepage at base of slopes improves site productivity; excessive moisture in depressions may retard plant growth.	Sandy loam or loam, acidic to neutral morainal deposits associated with volcanic and granitic bedrock. Generally very to exceedingly stony. Elevations range from 1600 to 1900 m (5000 to 6000 ft).	ME1	Podzolic Gray Luvisol	w,m	-	-	Moderately rolling to hilly (10-60% slopes).
		ME2	Podzolic Gray Luvisol	w,m	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		ME4	Podzolic Gray Luvisol	w,i	Orthic Sombric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation.
		ME5	Podzolic Gray Luvisol	w,i	Lithic Podzolic Gray Luvisol	w	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		ME6	Lithic Podzolic Gray Luvisol	w	Rock Outcrop		Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

MINNIE SOILS (MN)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Moderately extensive distribution, mainly between lower Nicola River and Ashcroft, south of Pavilion Lake, between Nicola Lake and Lac Le Jeune, and east of Trapp Lake *Seepage at base of slopes and in depressions improves site productivity.	Gravelly sandy loam or gravelly loam, moderately acid, morainal deposits associated ith granitic bedrock. Generally moderately to exceedingly stony. A modal profile (Orthic Gray Luvisol) described and sampled. Elevations range from 1050 to 1650 m (3500 to 5500 ft).	MN1	Orthic Gray Luvisol	w	-	-	Moderately rtolling to steeply sloping (10-30% slopes).
		MN2	Orthic Gray Luvisol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditons. These may be due to southerly aspects, lower elevations or combination.
		MN3	Orthic Gray Luvisol	w	Brunisolic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditons. These may be due to northerly aspects, upper elevations or combinations.
		MN4	Orthic Gray Luvisol	w	Orthic Black	w	Up to 40% inclusion of less common soil which has developed under mainly grass and shrub vegetation.
		MN5	Orthic Gray Luvisol	w	Lithic Gray Luvisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		MN6	Lithic Gray Luvisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

MOSSEY SOILS (MS)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with and without seral ponderosa pine). Fairly extensive distribution, mostly along the North Thompson Valley, south of Kamloops and west of Cache Creek. *Seepage at base of slopes and in depressions improves site productivity but may increase alkalinity or salinity.	Loam or silt loam, moderately alkaline, morainal deposits associated with basic volcanic and limestone bedrock. Generally slightly stony. Four modal profiles (Orthic Black) described and sampled. Elevations range from 750 to 1150 m (2500 to 3800 ft).	MS1	Orthic Black	w	-	-	Gently sloping to moderately rolling (less than 15% slopes). Vegetation is dominated by grass and shrub disclimax due to fire and grazing.
		MS2	Orthic Black	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		MS3	Orthic Black	w	Orthic Black	w	Up to 40% inclusion of taxonomically similar less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combinaiton. Organic matter enriched surface is thicker than the modal.
		MS4	Orthic Black	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly forested conditions.
		MS5	Orthic Black	w	Lithic Black and/or Lithic Eutric Brunisol	r	Up to 40% inclusion (in total) of less common soils which are <50 cm thick over bedrock.
		MS9	Orthic Black	w	Calcareous Black and/or Saline Black	w,m	Up to 40% inclusion (in total) of less common soils which are affected by saline or alkaline seepage.

OREGON JACK SOILS (O)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with and with- out ponderosa pine). Occurs occasionally in widely scattered map units.	Partly decomposed organic deposit. Elevations ranges from 1200 to 1800 m (4000 to 5000 ft).	O1	Typic Mesisol	p,vp	-	-	Nearly level to gently undulating topography.

PLACID SOILS[1] (PD)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Very limited distribution in the eastern half of the map area; occurs only as secondary association in map units.	Gravelly sandy loam or gravelly loamy sand colluvial deposits associated with volcanic bedrock. Generally very to excessively stony. Elevations range from 1350 to 1650 m (4500 to 5500 ft).	PD5	Orthic Humo-Ferric Podzol	w,r	Lithic Humo-Ferric Podzol	r	Strongly to very steeply sloping (10-60% slopes). Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.

RAIL SOILS[1,3] (RL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior white spruce zone. Very limited distribution in widely scattered map units.	Partly decomposed organic deposits.	RL1	Typic Mesisol	p,vp	-	-	Nearly level to undulating (less than 2% slopes).
	Elevation range from 975 to 1000 m (3200 to 3300 ft).	RL2	Typic Mesisol	p,vp	Terric Mesisol	p,vp	Up to 40% inclusion of less common soil in which the organic material is between 40 and 160 cm thick.

RAYONIER SOILS[1] (RA)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau, and Shuswap Highlands Physiographic Regions; Dry Interior Forest region; Subalpine Engelmann spruce – alpine fir zone. Very limited distribution in widely scattered map units.	Undecomposed organic deposits.	RA1	Fibrisol Great Group	p,vp	-	-	Nearly level to undulating (less than 2% slopes).
	Elevation range from 1700 to 1830 m (5600 to 6000 ft).	RA2	Fibrisol Great Group	p,vp	Typic Mesisol	p,vp	Up to 40% inclusion of less common soil which is partially decomposed.

RENNIE SOILS [1,3] (RE)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Very limited distribution along the North Thompson River.	Silt loam to fine sandy loam overlying loamy sand or sand fluvioglacial deposits derived from a variety of bedrock. Generally slightly stony. Elevations range from 330 to 750 m (1100 to 2500 ft).	RE4	Orthic Regosol	w	Orthic Dark Brown	w	Gently undulating (less than 2% slopes). Up to 40% inclusion of less common soil which has developed due to highly contrasting grassy vegetation.

ROCK OUTCROPS (RO)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Exposed rock is most common in the Coast and Cascade Mountains. Fairly extensive distribution. Some map units are large, for example, on the Cantilever Range and Stein Mountain, but most are relatively small.	Exposed bedrock areas of undifferentiated origin. Elevations range from 600 to 2960 m (980 to 9700 ft).	RO	Rock Outcrop	r	-	-	Rock outcrop areas tend to be steep and often occur in complex map units with soils developed from shallow colluvium.

SAATIN SOILS (SA)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Coast and Cascade Mountains Physiographic Regions; Coastal Forest Region (Coastal Transition Section); Subalpine Engelmann spruce – alpine fir zone. Limited distribution, mainly between Stein River and Texas Creek. *Seepage at base of slopes improves site productivity but in depressions its accumulation may hinder plant growth.	Loam or sandy loam, acidic to neutral morainal deposits associated with a variety of volcanic and granitic bedrock. Generally very to exceedingly stony. Elevations range from 1200 to 1800 m (4000 to 6000 ft).	SA1	Orthic Humo-Ferric Podzol	w	-	-	Strongly to very steeply sloping (10-60% slopes).
		SA2	Orthic Humo-Ferric Podzol	w	Degraded Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically drier conditons. These may be due to southerly aspects, lower elevations or combination.
		SA3	Orthic Humo-Ferric Podzol	w	Sombric Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation in areas subject to exposure and/or avalanching.
		SA4	Orthic Humo-Ferric Podzol	w	Luvisolic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has textures that are somewhat finer than usual.

SCUITTO SOILS (ST)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Bunchgrass zone.	Sandy loam to silt loam fluvial deposits associated with a variety of bedrock, mainly volcanic. Generally stone-free.	ST1	Orthic Brown	w	-	-	Nearly level to gently undulating (less than 2% slopes).
		ST11	Orthic Brown	w	Carbonated Dark Brown	w	Up to 40% inclusions of less common soil which has developed due to cultivation.
Limited distribution, mainly along the South Thompson River.	Elevations range from 330 to 600 m (1100 to 2000 ft).	ST12	Orthic Brown	w	Orthic Brown	w	Up to 40% of taxonomically similar less common soil which has developed under mainly shrub and forb vegetation in areas subject to cold air pooling.

SHUMWAY SOILS (SM)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Bunchgrass zone.	Sandy loam to silt loam, moderately alkaline, fluvioglacial fan deposits associated with a variety of bedrock. Generally stone-free.	SM1	Orthic Brown	w	-	-	Nearly level to gently undulating (less than 2% slopes).
		SM3	Orthic Brown	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
Very limited distribution; occurs mainly along the South Thompson River.	A modal profile (Orthic Brown) described and sampled. Elevations range from 330 to 600 m (1100 to 2000 ft).	SM11	Orthic Brown	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soils which has developed due to cultivation.

SOUES SOILS[2] (SO)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Interior Douglas-fir zone (with seral ponderosa pine). Very limited distribution.	Gravelly to very gravelly sandy loam or loamy sand, moderately alkaline colluvium associated with limestone bedrock. Generally very to exceedingly stony. Elevations range from 900 to 1650 m (3000 to 5500 ft).	SO1	Orthic Dark Brown	w	-	-	Moderately to extremely sloping (5 to over 60% slopes). Vegetation is dominated by grass and shrub disclimax due to fire and grazing.

SPIUS CREEK SOILS (SP)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without sera ponderosa pine).	Loam or sandy loam, mildly alkaline, morainal deposits associatedwith volcanic and granitic bedrock. Generally slightly to very stony.	SP1	Orthic Gray Luvisol	w	-	-	Strongly to very steeply sloping (15-60% slopes).
		SP2	Orthic Gray Luvisol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
Not extensive distribution; occurs mostly south and east of Lytton.	A modal profile (Orthic Gray Livisol) described and sampled.	SP3	Orthic Gray Luvisol	w	Podzolic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
*Seepage at base of slopes or in depressions improves site productivity.	Elevations range from 300 to 1200 m (1000 to 4000 ft).	SP5	Orthic Gray Luvisol	w	Lithic Gray Luvisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.

STOLLE SOILS[1] (SL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Interior white spruce zone.	Gravelly sand to sandy loam fluvioglacial deposits derived from a variety of bedrock. Generally slightly to exceedingly stony.	SL1	Orthic Eutric Brunisol	r	-	-	Undulating to gently rolling (2-10% slopes).
		SL3	Orthic Eutric Brunisol	r	Degraded Eutric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, lower elevations or combination.
Very limited distribution, mostly along the South Thompson River Valley.	Elevation range from 750 to 1350 m (2500 to 4500 ft).						

STRUTHERS SOILS[1] (SE)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine).	Sandy loam to gravelly sand, fluvioglacial deposits derived from a variety of bedrock. Generally slightly to exceedingly stony.	SE1	Orthic Eutric Brunisol	w,r	-	-	Undulating to moderately rolling (2-15% slopes).
Very limited distribution along the North Thompson River Valley.	Elevations range from 330 to 600 m (1100 to 2000 ft).						

SUCCOUR SOILS[1,2] (SR)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Very limited distribution along the North Thompson River.	Sandy loam to gravelly sand fluvioglacial deposits derived from a variety of bedrock. Generally slightly to exceedingly stony. Elevations range from 450 to 750 m (1500 to 2500 ft).	SR1	Degraded Eutric Brunisol	r	-	-	Undulating to gently rolling (2-10% slopes).
		SR4	Degraded Eutric Brunisol	r	Orthic Dark Gray	r	Up to 40% inclusions of less common soil which has developed under mixed forest and grass vegetation.

TEATHER SOILS[1] (TT)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Very limited distribution in the northeast corner of the map area.	Sandy loam to gravelly sand, ice-contact (ablation moraine) deposits derived from a variety of bedrock. Elevation range from 1050 to 1350 m (3500 to 4500 ft).	TT2	Degraded Dystric Brunisol	w	Orthic Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		TT3	Degraded Dystric Brunisol	w	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.

TERNAN SOILS[2] (TR)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Interior white spruce zone. Limited distribution on the Tranquille Plateau.	Sandy loam to gravelly sand fluvioglacial deposits derived from a variety of bedrock. Generally slightly to exceedingly stony. Elevations range from 1050 to 1350 m (3500 to 4500 ft).	TR1	Degraded Dystric Brunisol	r	-	-	Undulating to gently rolling (2-15% slopes).
		TR2	Degraded Dystric Brunisol	r	Degraded Eutric Brunisol	r	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.

TIMBER SOILS[2] (TM)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine).	Silt loam or silty clay loam, moderately alkaline, morainal deposits associated with volcanic bedrock. Generally slightly to moderately stony.	TM1	Degraded Eutric Brunisol	w	-	-	Gently sloping to strongly rolling (5-30% slopes).
		TM2	Degraded Eutric Brunisol	w	Orthic Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
Moderately extensive distribution, mainly along the lower Nicola River, south of Kamloops Lake and along the Fraser River Valley near Lillooet.	A modal profile (Degraded Eutric Brunisol) described and sampled.	TM3	Degraded Eutric Brunisol	w	Orthic Gray Luvisol	w	Up to 40% inclusion of less comon soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
	Elevations range from 300 to 1050 m (1000 to 3500 ft).	TM4	Degraded Eutric Brunisol	w	Orthic Dark Gray and/or Orthic Dark Brown	w	Up to 40% incluison (in total) of less common soils which have mainly developed under open forest or grassland conditions.
*Seepage at base of slopes and in depressions improves site productivity.		TM5	Degraded Eutric Brunisol	w	Lithic Eutric Brunisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		TM6	Lithic Eutric Brunisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		TM8	Degraded Eutric Brunisol	w	Orthic Regosol	w	Up to 40% inclusion of less common soil which has been affected by sheet, rill and/or gully erosion.

TISDALL SOILS[1] (TD)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest region; Subalpine Engelmann spruce – alpine fir zone.	Sandy loam to gravelly sand ice-contact (ablation moraine) deposits associated with volcanic bedrock. Generally moderately to excessively stony.	TD1	Orthic Humo-Ferric Podzol	w	-	-	Moderately rolling to hilly (10-60% slopes).
		TD2	Orthic Humo-Ferric Podzol	w	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of taxonomically similar but less deeply weathered less common soil which has developed under edaphically drier conditions. These may be due to southerly aspects, lower elevations or a combination.
Limited distribution, mainly on the Tranquille Plateau.		TD3	Orthic Humo-Ferric Podzol	w	Orthic Humo-Ferric Podzol	w	Up to 40% inclusion of taxonomically similar but more deeply weathered less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
*Seepage at base of slopes or in depressions improves site produtivity, but may present a constaint to engineering uses.	Elevations range from 1200 to 1650 m (4000 to 5500 ft).	TD4	Orthic Humo-Ferric Podzol	w	Degraded Dystric Brunisol	w	Up to 40% inclusion of less common soil which has developed under more open forested vegetation.

TOLE SOILS[1] (TL)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiographic Region; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Very limited distribution on the Tranquille Plateau.	Sandy loam to gravelly sand ice-contact (ablation moraine) deposits associated with granitic bedrock. Generally exceedingly to excessively stony. Elevations range from 1200 to 1650 m (4000 to 5500 ft).	TL1	Orthic Humo-Ferric Podzol	w	-	-	Moderately rolling to hilly (10-60% slopes).
		TL4	Orthic Humo-Ferric Podzol	w	Sombric Humo-Ferric Podzol	w,i	Up to 40% inclusion of less common soil which has developed under edaphically moister conditions.

TRACHYTE SOILS (TH)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Fairly extensive distribution, mainly south and east of Nicola Lake. *Seepage at base of slopes and in depressions improves site productivity but may also increase salinity and/or alkalinity.	Silt loam or silty clay loam, moderately alkaline, weakly saline, morainal deposits associated with volcanic bedrock. Generally slightly to moderately stony. Five modal profiles (Orthic Black) were described and sampled. Elevations range from 1050 to 1260 m (3500 to 4200 ft).	TH1	Orthic Black	w	-	-	Gently sloping to strongly rolling (5-30% slopes). Vegetation is dominated by grass and shrub disclimax due to fire and grazing.
		TH2	Orthic Black	w	Orthic Black	w	Up to 40% inclusion of taxonomically similar but less deeply weathered, less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		TH3	Orthic Black	w	Eluviated Black	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		TH4	Orthic Black	w	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under mainly forested conditions.
		TH5	Orthic Black	w	Lithic Black and/or Lithic Gray Luvisol	r	Up to 40% inclusion (in total) of less common soils which are <50 cm thick over bedrock.
		TH6	Lithic Black and/or Lithic Gray Luvisol	r	Rock Outcrop	r	Most common soils are <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		TH9	Orthic Black	w	Saline Black and/or Calcareous Black	w,i	Up to 40% inclusion (in total) of less comon soils which are affected by saline or calcareous seepage.
		TH10	Orthic Black	w	Carbonated Black	w	Up to 40% inclusion of less common soil which has an identifiable plough layer due to cultivation.
		TH11	Orthic Black	w	Orthic Black	w	Up to 40% inclusion of less common soil which has a significantly different texture.

TRANQUILLE SOILS (TQ)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Bunchgrass zone. Limited distribution, mostly east of Kamloops, along Kamloops Lake and along the Thompson River to Spences Bridge.	Silt loam or silty clay loam, strongly alkaline, weakly saline, morainal deposits associated with volcanic bedrock. Generally slightly to very stony. A modal profile (Orthic Brown) was described and sampled. Elevations range from 120 to 750 m (600 to 2500 ft).	TQ1	Orthic Brown	w	-	-	Gently sloping to gently rolling (2-9% slopes).
		TQ3	Orthic Brown	w	Orthic Dark Brown	w	Up to 40% inclusions of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		TQ4	Orthic Brown	w	Orthic Dark Gray and/or Degraded Eutric Brunisol	w	Up to 40% inclusion (in total) of less common soils which have developed under mainly forested conditions.
		TQ5	Orthic Brown	w	Lithic Brown	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		TQ6	Lithic Brown	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		TQ8	Orthic Brown	w	Rego Brown	r	Up to 40% inclusion of less common soil which has been affected by sheet, rill and/or gully erosion.
		TQ9	Orthic Brown	w	Saline Dark Brown	w,i	Up to 40% inclusion of less common soil which has developed due to saline seepage.
		TQ10	Orthic Brown	w	Carbonated Dark Brown	w	Up to 40% inclusion of less common soil which has an identifiable plough layer due to cultivaiton.
		TQ11	Orthic Brown	w	Orthic Brown	w	Up to 40% inclusion of less common soil which has a significantly different texture.

TRAPP LAKE SOILS (TP)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments*
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest Region; Interior Douglas-fir zone (with seral ponderosa pine). Fairly extensive distribution, mainly in the vicinity of Ashcroft, Savonna, Knutsford, and Douglas Lake. *Seepage at base of slopes and in depressions improves site productivity, but may increase salinity.	Silt loam or silty clay loam, mildly alkaline, weakly saline morainal deposits associated with volcanic bedrock. Generally slightly to moderately stony. A modal profile (Orthic Dark Brown) described and sampled. Elevations range from 600 to 900 m (2000 to 3000 ft).	TP1	Orthic Dark Brown	w	-	-	Gently sloping to strongly rolling (2-15% slopes). Vegetaion is dominated by grass and shrub disclimax due to fire and grazing.
		TP2	Orthic Dark Brown	w	Orthic Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		TP3	Orthic Dark Brown	w	Orthic Black	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		TP4	Orthic Dark Brown	w	Orthic Dark Gray and/or Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soils which have developed under mainly forested conditions.
		TP5	Orthic Dark Brown	w	Lithic Dark Brown and/or Lithic Eutric Brunisol	r	Up to 40% inclusion (in total) of less common soils which are <50 cm thick over bedrock.
		TP6	Lithic Dark Brown and/or Lithic Eutric Brunisol	r	Rock Outcrop	r	Most common soils are <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		TP8	Orthic Dark Brown	w	Rego Dark Brown	r	Up to 40% inclusion of less common soil which has been affected by sheet, rill and/or gully erosion.
		TP9	Orthic Dark Brown	w	Saline Black	w,i	Up to 40% inclusion of less common soil which has been affected by saline seepage.
		TP10	Orthic Dark Brown	w	Carbonated Black	w	Up to 40% inclusion of less common soil which has an identifiable plough layer due to cultivation.
		TP11	Orthic Dark Brown	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has a significantly different texture.

TRUDA MOUNTAIN SOILS (TU)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Subalpine Englemann spruce – alpine fir zone. Fairly extensive distribution, mainly in the vicinity of Upper Hat Creek, and west and north of the lower Highland Valley. *Seepage at base of slopes will improve site productivity; in depressions, seepage may retard growth.	Silt loam or loam, mildly alkaline morainal deposits associated with volcanic bedrock. Generally moderately to very stony. A modal profile (Brunisol Gray Luvisol) described and sampled. Elevations range from 1650 to 2100 m (5500 to 7000 ft).	TU1	Brunisolic Gray Luvisol	w	-	-	Moderately sloping to very hilly (5-60% slopes).
		TU2	Brunisolic Gray Luvisol	w	Orthic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		TU4	Brunisolic Gray Luvisol	w	Orthic Sombric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation.
		TU5	Brunisolic Gray Luvisol	w	Lithic Brunisolic Gray Luvisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		TU6	Lithic Brunisolic Gray Luvisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.

TSINTSUNKO SOILS[1] (TO)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Fraser Plateau Physiogrphic Region; Dry Interior Forest Region; Subalpine Engelmann spruce – alpine fir zone. Very limited distribution on the Tranquilly Plateau.	Sandy loam to silt loam morainal deposits associated with volcanic bedrock. Generally moderately to very stony. Elevations are in excess of 1650 m (in excess of 5500 ft).	TO1	Orthic Ferro-Humic Podzol	w	-	-	Moderately rollling (10-15% slopes).
		TO3	Orthic Ferro-Humic Podzol	w	Orthic Ferro-Humic Podzol	m	Up to 40% inclusion of taxonomically similar less common soil which has developed under edaphically or climatically wetter conditions.
		TO5	Orthic Ferro-Humic Podzol	w	Lithic Ferro-Humic Podzol	r	Up to 40% inclusions of less common soil which is <50 cm thick over bedrock.

TULLEE SOILS (TE)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson Plateau Physiographic Region; Dry Interior Forest region; Interior Douglas-fir zone (with or without seral ponderosa pine). Moderately extensive distribution, mostly near Douglas and Minnie lakes and in the vicinity of Knutsford. *Seepage at base of slopes and in depressions improves site produtivity, but may also increase salinity.	Silt loam or silty clay loam, moderately alkaline morainal deposits associated with volcanic bedrock. Generally slightly to moderately stony. A modal profile (Orthic Black) described and sampled. Elevations range from 750 to 1050 m (2500 to 3500 ft).	TE1	Orthic Black	w	-	-	Gently sloping to strongly rolling. Vegetation is dominated by grass and shrub disclimax due to fire and grazing.
		TE2	Orthic Black	w	Orthic Dark Brown	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combination.
		TE3	Orthic Black	w	Orthic Black	w	Up to 40% inclusion of taxonomically similar but more deeply weathered less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combinaiton.
		TE4	Orthic Black	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soils which has developed under mainly forested conditions.
		TE5	Orthic Black	w	Lithic Black and/or Lithic Eutric Brunisol	r r	up to 40% inclusion (in total) of less common soils which are <50 cm thick over bedrock.
		TE6	Lithic Black and/or Lithic Eutric Brunisol	r	Rock Outcrop	r	Most common soils are <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		TE9	Orthic Black	w	Saline Black	m	Up to 40% inclusion of less common soil which is affected by saline seepage.
		TE10	Orthic Black	w	Carbonated Black	w	Up to 40% inclusion of less common soil which has developed due to cultivation.
		TE11	Orthic Black	w	Carbonated Black	w	Up to 40% inclusion of less common soil which has developed due to coarser texture.

TUNKWA SOILS[1,2,3] (TW)

Location and Forest Zone	Parent Materials and Texture	Map Symbol	Most Common Soil		Less Common Soil		Comments
			Classification	Drainage	Classification	Drainage	
Thompson and Fraser Plateau Physiographic Regions; Dry Interior Forest Region; Interior Douglas-fir zone (without seral ponderosa pine). Very extensive distribution, mostly between Kamloops Lake and Merritt, and north of Kamloops Lake and Thompson River. Less extensive areas occur south of the lower Nicola Valley.	Silt loam or loam, mildly alkaline, morainal deposits associated with volcanic bedrock. Generally slightly to very stony. A modal profile (Orthic Gray Luvisol) described and sampled. Elevations range from 1050 to 1650 m (3500 to 5500 ft).	TW1	Orthic Gray Luvisol	w	-	-	Gently sloping to strongly rolling (5-30% slopes).
		TW2	Orthic Gray Luvisol	w	Degraded Eutric Brunisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically drier conditions. These may be due to southerly aspects, lower elevations or combiantion.
		TW3	Orthic Gray Luvisol	w	Brunisolic Gray Luvisol	w	Up to 40% inclusion of less common soil which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or combination.
		TW4	Orthic Gray Luvisol	w	Orthic Black	w	Up to 40% inclusion of less common soil which has developed mainly under grass and shrub vegetation.
		TW5	Orthic Gray Luvisol	w	Lithic Gray Luvisol	r	Up to 40% inclusion of less common soil which is <50 cm thick over bedrock.
		TW6	Lithic Gray Luvisol	r	Rock Outcrop	r	Most common soil is <50 cm thick over bedrock. Up to 40% inclusion of rock outcrops.
		TW10	Orthic Gray Luvisol	w	Orthic Gray Luvisol	w	Up to 40% inclusion of taxonomically similar less common soil with an identifiable plough layer.
		TW11	Orthic Gray Luvisol	w	Orthic Dystric Brunisol	w	Up to 40% inclusion of less common soil with somewhat coarser textures.
		TW12	Orthic Gray Luvisol	w	Orthic Sombric Brunisol	w	Up to 40% inclusion of less common soil which has developed under mainly shrub and forb vegetation in areas subject to exposure (cold temperatures).

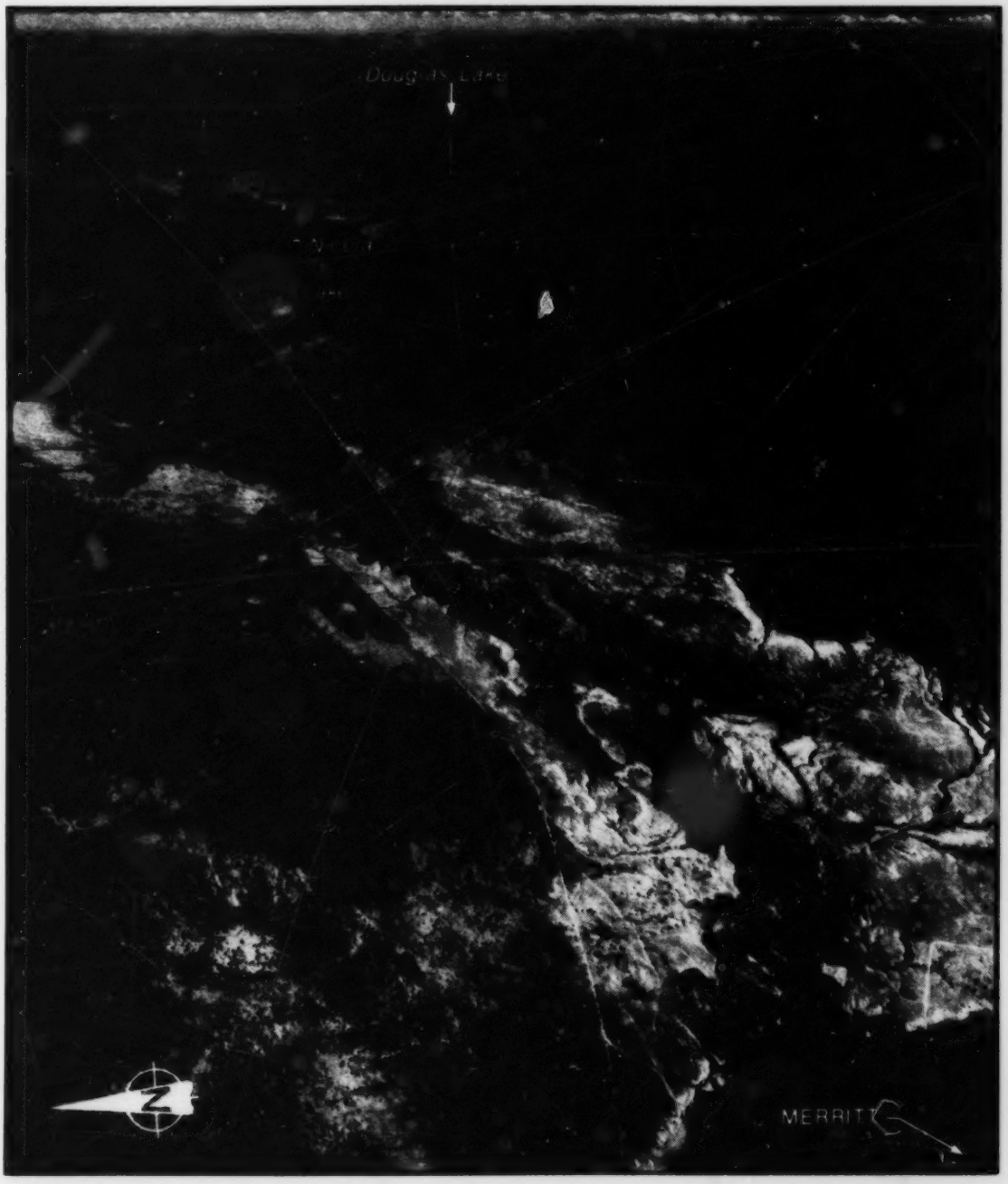


Plate 5: Merritt East to Douglas Lake

The extensive grasslands around Douglas and Nicola lakes are primarily on soils of the Tullee and Trachyte associations which have developed on moderately alkaline morainal deposits. These Black Chernozem soils are the most productive of the grassland soils. The lighter tones on either side of the Nicola River are lacustrine deposits on which Lundbom and Lac du Bois soil associations occur. The Lac du Bois soils have subsurface salts and require special management considerations. Soils along the Nicola River floodplain belong to the Frisken association. B.C. Photo 651:34.

Chapter Five

Selected Soil Interpretations

5.1 Agriculture, Forest and Grazing Capability of the Soil Associations

Each soil association is given a representative rating for forestry, agriculture and grazing capability in Table 17. The ratings are not directly comparable. Forest capability class 1, for example, does not necessarily equate to agriculture capability class 1, either in terms of biomass production, economic value or social benefit. The definitions used in each rating system are given in the following pages.

5.1.1 Typical Forest Capability Rating

Forest capability is a rating of potential productivity of a mapping unit. The seven capability classes are determined by the kind and severity of factors limiting forest production such as excess moisture, shallow soil and adverse climate. Capability ratings assume good land and stand management practices with optimum stocking. Forest capability improves with the presence of seepage in the mapping unit. Seepage (additional soil moisture) is indicated for each soil association where applicable, throughout the map area (see Soil Moisture Phases, Chapter 4.4).

Forestry capability maps are based on soils information; however, many of the units are more general and the boundaries do not always directly coincide with the soils/landform map units. The forest capability maps do, however, provide a general picture of the forestry potential within the Ashcroft map area and show which areas have the highest capability. These maps, at a scale of 1:50 000, are available from the same source as this publication. Kowall (1971) and McCormack (1967) describes in greater detail how the Forestry Capability Classes are determined.

The Forest Capability Rating System is outlined in Table 14 and is based on the Canada Land Inventory, Land Capability for Forestry system. The capability classes used for the Ashcroft map area in Table 17 are described below. Forest productivity estimates are based on a rotation age of 100 years. Within Table 17, N/A means not applicable or little or no commercial forest capability.

Table 14. Forestry Capability Classes and Subclasses

Class	Description
1	Lands having no important limitations to the growth of commercial forests. Soils are deep, permeable, of medium texture, moderately well drained to imperfectly drained, have good water holding capacity and are naturally high in fertility. Their topographic position is such that they frequently receive seepage and nutrients from adjacent areas. They are not subject to extremes of temperature or evapotransportation. Productivity is usually greater than 7.7 cubic metres per hectare per year.
2	Lands having slight limitations to the growth of commercial forests. Soils are deep, well drained to moderately well drained, and have good water holding capacity. The most common limitations are adverse climate and the cumulative effects of several minor adverse soil characteristics. Productivity is usually between 6.4 to 7.7 cubic metres per hectare per year.
3	Lands having moderate limitations to the growth of commercial forests. Soils may be deep to somewhat shallow, well to moderately well drained with moderate to good water holding capacity. They may be slightly low in fertility or suffer from periodic moisture imbalances. Productivity is usually between 5.0 to 6.3 cubic metres per hectare per year.
4	Lands having moderately severe limitations to the growth of commercial forests. Soil characteristics vary considerably. The most common limitations are moisture deficiency and adverse climate. Productivity is usually between 3.6 to 4.9 cubic metres per hectare per year.
5	Lands having severe limitations to the growth of commercial forests. Soils are frequently shallow to bedrock, stony and well to rapidly drained. The most common limitations (often in combination) are moisture deficiency, shallowness to bedrock, and adverse climate. Productivity is usually between 2.2 to 3.5 cubic metres per hectare per year.
6	Lands having severe limitations to the growth of commercial forests. Soils are frequently shallow, stony and rapidly to well drained. A large proportion of the land in this class is composed of open, steep, south-facing, colluvial slopes. The most common limitations (frequently in combination) are shallowness to bedrock, deficiency of soil moisture, and adverse exposure. Productivity is usually between 0.8 to 2.1 cubic metres per hectare per year.
7	Lands having such severe limitations that the growth of commercial forests is precluded. Soils that are extremely shallow to bedrock, actively eroding or extremely dry are usually placed in this class. Poorly drained organic soils are also included. The most common limitations ar shallowness to bedrock, excessive soil moisture and extremes of climate or exposure. Productivity is usually less than 0.8 cubic metres per hectare per year.

Table 14 (cont'd). Forestry Capability Classes and Subclasses

Subclass	Description
A	drought or aridity as a result of climate. Water deficits exist during the growing season due to relatively low seasonal precipitation.
C	adverse climate — usually high elevation, alpine or subalpine areas.
E	actively eroding soils.
H	low temperatures which result in a short, cool growing season.
M	soil moisture deficiency attributable to soil characteristics such as low water holding capacity and rapid drainage.
R	restriction of rooting zone by bedrock. Soils are shallow and generally coarse textured.
S	a combination of minor soil factors which adversely effect growth.
U	solar exposure associated with steep, south-facing slopes which results in increased water deficits during the growing season due to significant evapotranspirational losses.
W	excess soil moisture; e.g., poorly drained organic or gleysolic soils.

Indicator species refers to those commercially acceptable forest species that are best suited in each mapping unit.

Species Symbols:

pP	ponderosa pine	alF	alpine fir
D	Douglas-fir	wC	western red cedar
lP	lodgepole pine	wH	western hemlock
eS	Engelmann spruce	mH	mountain hemlock

5.1.2 Typical Agriculture Capability Rating

The agriculture capability ratings in Table 17 are based on the Canada Land Inventory, (1969). This system was refined by the B. C. Land Inventory, (1972). Agriculture Capability ratings take into account the range of crops possible and not the productivity (i.e. yield/ hectare) of any crop. The wider the range of crops the higher the capability class on a scale of 1 to 7. Agriculture capability is determined by the combination of climate and soil factors. Class 1 agriculture land has no climatic or soil limitations. All

other classes (2 to 7) have some limitation which reduces the capability, such as shallow depth, coarse textures, low moisture holding capacity, or stoniness. Adverse climate such as insufficient climatic moisture or a short growing season reflected by few frost-free days can also reduce ratings as can topography. Climatic parameters and range of crops are given in Table 2 in Chapter 1.4.

The general climatic limitation within the Ashcroft map area is insufficient moisture, and the columns labelled unimproved and improved usually refer to irrigation as the improvement. Other improvements may be removal of surface stones, installation of drainage where necessary, or addition of fertilizers.

Agriculture capability ratings assume that lands are well managed or managed at a level which is sufficient to realize the natural capability. The agriculture classes and subclasses and the abbreviations used in Table 17 are defined in Table 15.

The soil capability for Agriculture maps are available from MAPS-B.C., Surveys and Resource Mapping Branch, British Columbia Ministry of Crown Lands, Victoria.

A wide range of vegetables and fruits means that crops such as the following can be grown: asparagus, beans, beets, broccoli, brussels sprouts, cabbage, carrots, cauliflower, celery, kohlrabi, leeks, lettuce, parsnips, peas, potatoes, radishes, rhubarb, turnips, spinach, Swiss chard, strawberries and raspberries.

Forage crops refers to crops such as alfalfa, red clover, alsike clover, orchard grass, and brome grass.

Cereal grains refer to crops such as wheat, oats, and barley.

In **some** areas improvements to the soil by irrigation or drainage may not improve or expand the range of crops able to be grown; however, these improvements may increase yields significantly. Economic feasibility criteria should be applied to each **management** unit to determine the cost/benefit of such endeavours.

Within Table 17, N/A means not applicable and refers to non-arable or not suited to native forage production.

Table 15. Agriculture Capability Classes and Subclasses

Class	Description
1	Soils in this class have no significant limitations for crops. The soils are deep, well to imperfectly drained, hold moisture well, and are well supplied with plant nutrients. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for a wide range of field crops.
2	Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices. The soils are deep and hold moisture well. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a fairly wide range of crops.
3	Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices. The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage, planting and harvesting; choice of crops; and methods of conservation. Under good management they are fairly to moderately high in productivity for a fair range of crops.
4	Soils in this class have severe limitations that restrict the range of crops or require special conservation practices, or both. The limitations seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting; choice or crops; and methods of conservation. The soils are low to fair in productivity for a fair range of crops but may have high productivity for a specially adapted crop.
5	Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible. The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants, and may be improved by use of farm machinery. The improvement practices may include fertilizing or water control.
6	Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible. The soils provide some sustained grazing for farm animals, but the limitations are so severe that improvement by use of farm machinery is impractical. The terrain may be unsuitable for use of farm machinery, or the soils may not respond to improvement, or the growing season may be very short.
7	Soils in this clss have no capability for arable culture or permanent pasture. This class also includes rockland, other non-soil areas, and bodies of water too small to be shown on maps.

Table 15 (cont'd). Agriculture Capability Classes and Subclasses

Subclass	Description
C	adverse climate: refers to a short growing season.
D	undesirable soil structure and/or low permeability: refers to soils which are difficutl to till or which absorb water slowly; also refers to soils with layers that physically reduce rooting depth.
E	erosion: soil erosion has reduced agricultural use and productivity; soils which have gullies that impair agriculture practice and productivity.
F	low fertility: lack of available plant nutrients may be due to high acidity or alkalinity, low nutrient exchange capacity, high levels of carbonates or the presence of toxic compounds.
I	inundation by lakes or streams: inundation causing crop damage or restricting agricultural use.
M	moisture limitation: soils with low moisture holding capacity.
N	salinity: salts adversely affect crop growth, or range of crops.
P	stoniness: soils are sufficiently stony to hinder tillage, planting and harvesting operations.
R	rockiness: bedrock outcrops occur at or near the soil surface.
T	topography: adverse slope gradient and/or pattern or frequency of slopes in different directions.
W	excess water: inadequate soil drainage, high water table, or runoff from surrounding areas.

5.1.3 Typical Grazing Capability Ratings

The grazing capability ratings are based on Runka (1973) and McLean and Marchand (1968), and more recently summarized by the Forage Classification System (Demarchi and Harcombe, 1982). Grazing capability is a 5 class system which rates the productivity of land with regard to its ability to produce native forage, mainly bunchgrass, fescues, or pinegrass. The rating system is summarized in Table 16.

Maps of grazing capability in the Ashcroft map area are not available, but can be derived by applying the ratings given in this report to the map polygons on the soil map. The rating is representative of the potential only and provides a guide to the relative importance of each soil association for grazing uses.

Table 16. Grazing Capability Classes and Subclasses (Runka, 1973)

Class	Description
1	Lands in this class have no limitations for the production of native forage plants. Soils are deep, permeable, medium-textured, moderately well to imperfectly drained, and naturally fertile. These lands are not subject to extremes in temperature and evapotranspiration. Production of forage is greater than 1125 kg/ha/year. This class is commonly associated with Black Chernozem soils in the uppper grassland areas.
2	Lands in this class have slight limitations for the production of native forage plants. Soils are deep, well drained and have good moisture holding capacity. These lands have slight limitations due to moisture deficiency, restricted rooting depth, light forest competition, adverse climate, or the cumulative effects of several limitations. Production of forage is between 570 and 1125 kg/ha/year.
3	Lands in this class have moderate limitations for the production of native forage plants. Soils may be deep to somewhat shallow, well to imperfectly drained, medium to fine in texture with moderate to good water holding capacity. Soils may be slightly low in fertility or suffer from periodic moisture imbalances. The most common limitations are adverse climate, restricted rooting depth, moderate forest competition, moderate deficiencies or excesses of moisture, somewhat low fertility, exposure and/or occasional innundation. Production of forage is between 280 and 570 kg/ha/year. This class commonly occurs on Brown Chernozem soils of the lower grasslands, on soils with Eutric Brunisol development in the Interior Douglas-fir Zone (with seral ponderosa pine), and on Brunisolic Gray Luvisol soils supporting lodgepole pine stands in the Engelmann Spruce - Subalpine fir Zone.
4	Lands in this class have moderately severe limitations for the production of native forage plants. The most common limitations are deficient or excess moisture, adverse climate, restricted rooting depth, forest competition, poor structure, excessive carbonates and/or low fertility. Production of forage is between 142 and 280 kg/ha/year. This class is commonly associated with Eutric and Dystric Brunisol soils in the Interior Bunchgrass, Interior Douglas-fir and Englemann Spruce-Subalpine Fir forest zones.

Table 16 (cont'd). Grazing Capability Classes and Subclasses (Runka, 1973)

Class	Description
5	Lands in this class have severe limitations for the production of native forages. Soils in this class are considered unsuitable for grazing due to overriding climatic and environmental limitations. The most common limitations (often in combination) are deficient or excess soil moisture, shallowness to bedrock, adverse regional or local climate, forest competition, excessive stoniness, high levels of carbonates and/or salts, and low natural fertility. Production of forage is usually less than 142 kg/ha/year.
N/A	Not applicable; can be considered a sixth class with no grazing capability.

Subclass	Subclass Limitations
A	Drought or aridity caused by aspect, landscape position, exposure or combinations of these; includes regional climatic aridity.
H	Accumulations of deep snow and/or a short, cool growing season.
I	Soils subject to inundation by lakes and streams for long periods.
M	Moisture deficiencies attributable to soil and land characteristics (ie. low soil moisture holding capacity).
N	Poor soil fertility due to the presence of toxic elements, such as soluble salts.
V	Soils limited for native forage production by excessive competition from other vegetation. This symbol is used where it is assumed that land management will continue to recognize the forestry values.
R	The restriction of the rooting zone by bedrock.
T	Percent slope and pattern and frequency of slopes in different directions limit these map units.
W	An excess of soil moisture, other than that caused by innundation.

Table 17. Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Allamore	3S-5R M	lP;eS	combination of minor factors, shallow soil, soil moisture	6T;6T R	4/A	grazing	N/A	topography, frost-free period, shallow soils	5V-2V	pinegrass	vegetation competition (summer)
Abbott	4M-3S	lP;eS	soil moisture, combination of minor factors	6P; 6P W	N/A	grazing	N/A	stoniness, perched watertable, frost-free period	5V	pinegrass	forest competition (summer)
Andrew	5M-4M	D; lP	capability improves in moist swales, soil moisture	5T-6T P P	4T-6T P P	grazing, improved pasture	forages, grazing	stoniness, topography, soil moisture	4M V	pinegrass	forest competition, moisture (summer)
Ashton	3S	lP; D	combination of minor factors	6P T	N/A	grazing	N/A	stoniness, topography, frost-free period	5V	pinegrass	forest competion (summer)
Alkali	3S-4M-5R M	lP; eS	combination of minor factors, soil moisture, shallow soil	6T-5P R T	6T-5P R T	improved pasture, grazing	improved pasture, grazing	topography, stoniness, shallow soils, frost-free period	4V-5V	pinegrass	vegetation competition, vegetation type (summer)
Artisan	3S-5R M	D;lP;eS	combination of minor factors, shallow soil, soil moisture	6T-7T C	N/A	grazing	N/A	topography, frost-free period.	4V-5V	pinegrass	vegetation competition, vegetation type (summe.)
Aylmer	7A	N/A	climatic aridity	5T-6T M ?	4T-6T P P	improved pasture, grazing	forages, grazing	topography, stoniness	2M	bunchgrass	moisture (fall and spring)
Blustery	7C-7C R	N/A	Krummholz – mainly open forested	6T;6T; R 7R	N/A	grazing	N/A	topography, shallow to rock, rock outcrops	4H-4H R	alpine grass and forbes	exposure, shallow to bedrock, frost-free period (summer)
Bester	4M-7W	lP;D	soil moisture, fluctuating water table	4W-5I W	2W-5I W	forages, cereal grains, improved pasture	range of heat loving crops, forages, cereal grains, improved pasture	fluctuating water table, periodic inundation	2V-4I V	riparian vegetation	vegetation competition, periodic inundation (summer–early fall)
Beaverhut	4M-3S-5R M	lP;eS	soil moisture, combinaiton of minor factors, shallow soil	6T R	N/A	grazing	N/A	topography, shallow soil, frost-free period	4V-5V	pinegrass	vegetation competition, vegetation type (summer)
Beaver	5A-3M M	D;lP	climatic aridity, soil moisture	5X-7T C	5P-7T C	improved pasture, N/A	improved pasture, N/A	combination of minor factors, stoniness, topography, frost-free period	4V-3V	pinegrass	vegetation competition (summer)
Bowman	4M-5R M	lP;eS	soil moisture, capability may improve in seepage areas	6T;6T; R 7R	N/A	grazing	N/A	topography, shallow to rock, rock outcrops, frost-free period	5V	pinegrass	forest competition (summer)

Table 17 (cont'd). Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Boxer Creek	3S-4M	lP;eS	combination of minor factros	7C	N/A	N/A	N/A	frost-free period	5V	pinegrass	vegetation competition (summer)
Conant	6A;6A M R	D;pP	climatic aridity, soil moisture, shallow soil, talus	6T;6T R	N/A	grazing	N/A	topography, shallow to rock, rock outcrop	4M V	bunchgrass	moisture, vegetation competition (spring & fall)
Carabine	7A	N/A	climatic aridity	5M	2M	grazing, improved pasture	wide range of heat loving crops, forages, cereal grains	soil moisture	4M A	bunchgrass	soil moisture, aridity (spring & fall)
Cache Creek	7A	N/A	climatic aridity	5M P	3N P	grazing improved pasture	wide range of salt tolerant crops, forages, cereal grains	salinity, stoniness	4M N	bunchgrass	soil moisture, salinity (spring & fall)
Cavanaugh	5A-6A M R	D;pP	climatic aridity, shallow soil, talus	5T-6T; P P 7R	N/A	grazing, improved pasture	improved pasture, grazing	topography, stoniness, rock outcrops	4A M	bunchgrass	climatic aridity, soil moisture (spring & fall)
Calling	1-2S-7E	eS;alF; mH	no limitation, combination of minor factors, severe erosion (avalanche)	7T C	N/A	N/A	N/A	topography, stoniness, frost-free period	N/A	N/A	vegetation competition, vegetation type
Chasm	4M-5A-6A M R	D;lP	soil moisture, climatic aridity, shallow soil, talus	6T;6T P R 7R	N/A	grazing	N/A	topography, stoniness, shallow soil, rock outcrops	4M V	pinegrass	soil moisture, vegetation competition (summer)
Crown Mountain	6A M	D	climatic aridity, soil moisture	6T-5M P P	5P F	grazing, improved pasture	improved pasture	topography, stoniness, alkalinity	3M-4M V	bunchgrass	soil moisture, vegetation competition (spring & fall)
Commonage	7A	N/A	climatic aridity	5M P	1-4T P	grazing, improved pasture	wide range of heat loving crops, cereal grains, forages	topography, stoniness	3M	bunchgrass	soil moisture (spring & fall)
Clapperton	5A-6A M R	D;pP	climatic aridity, soil moisture, shallow soil, talus	6T;6T P R	N/A	grazing	N/A	topography, stoniness, shallow soil, rock outcrops	4M V	pinegrass	soil moisture, vegetation competition (summer)
Cairn Mountain	4M-6R M	lP;D	soil moisture, shallow soil	6T-7R R	N/A	grazing	N/A	topography, shallow soil, rock outcrops	5V	pinegrass	vegetation competition (summer)

Table 17 (cont'd). Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Carson	5A-6A M R	D	climatic aridity, soil moisture, shallow soils	6T-6T-P R 7R	N/A	grazing	N/A	topography, stoniness, shallow soil, rock outcrops	4M V	pinegrass and bunchgrass	soil moisture, vegetation competition (summer)
Courtney	7A	N/A	climatic aridity	5M T	1-3T P	grazing	wide range of heat loving crops, forages, cereal grains	topography, stoniness	4M	bunchgrass	soil moisture (early spring & late fall)
Cochiwa	3S-4H-7E	eS;alF;mH	combination of minor factors, severe erosion (avalanche)	7T C	N/A	N/A	N/A	topography, stoniness, frost-free period	N/A	N/A	vegetation competition, vegetation type
Clemson	5R-4M-6T M R -6U R	lP;eS	shallow soil, soil moisture, topography, exposure (aspect)	6T;6T R	N/A	grazing	N/A	topography, shallow soil, frost-free period	5V	ppinegrass	vegetation competition (summer)
Curnow	1-2S	D;wH;eS	no limitation, combination of minor factors	7T C	N/A	N/A	N/A	topography, stoniness, frost-free period	N/A	N/A	vegetation competition, vegetation type
Chataway	5T-4M-6U M R	lP;eS	shallow soil, soil moisture, exposure (aspect)	6T;6T-7R R	N/A	grazing	N/A	topography, shallow soil, frost-free period, rock outcrops	5V	pinegrass	vegetation competition (summer)
Cedarbench	3S-2S	D;lP;wH	combinaiton of minor factors	7T C	N/A	N/A	N/A	topography, frost-free period, stoniness	N/A	N/A	vegetation competition, vegetation type
Dunleavy	4M	lP;D	soil moisture	3P-4W M I	2P-3W I	range of vegetable crops, forages, cereal grains	range of heat loving crops (except root crops), forages, cereal grains	stoniness fluctuating watertable, periodic inundation	3V-4I	pinegrass, riparian vegetation	vegetation competition, periodic inunation (summer-early fall)
Dominic	7A M	pP	climatic aridity, soil moisture	5M	1-2T M	grazing, improved pasture	wide range of heat loving crops, forages, cereal gains	no soil limitations, topography, soil moisture	4M V	bunchgrass	soil moisture, vegetation competition (spring & fall)
Eugene	4M-3S	D;lP	soil moisture, combination of minor factors	6P-5C T	6P-5C T	grazing, improved pasture	grazing, improved pasture	stoniness, topography, frost-free period	5V	pinegrass	vegetation competition (summer)

Table 17 (cont'd). Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Fleet Creek	4W	bCo;pP	soil wetness (fluctuating watertable)	5M - 3I W	1-3T-2X M	improved pasture, cereal grains, forages	wide range of heat loving crops, cereal grains, forages	soil moisture topography, periodic inundation, soil wetness	2V	bunchgrass or riparian vegetation	vegetation competition
Frisken	5W N	bCo	soil salinity, soil wetness	4W M	3W-2W N	forages, cereal grains	heat loving crops with salt tolerance, forages, cereal grains	soil moisture, soil salinity, fluctuating watertable	4N-2V	riparian vegetation	soil salinity, vegetation competition
Frances	5W	bCo	soil wetness	3W M	2X-3T	forages, cereal grains, heat loving crops	heat loving crops forages, cereal grains	soil moisture, tpography, fluctuating watertable	4V	riparian vegetation	vegetation competition
Flat Creek	7A	N/A	climatic aridity	3I-4T T W	2X-4I W	forages, cereal grains, heat loving crops	forages, cereal grains, wide range of heat loving crops	periodic inundation, topographiy, combination of factors, fluctuating watertable	2I M	bunchgrass	inundation shortens season, then soil moisture deficiency
Godey	7A	N/A	climatic aridity	5M-6T P P	2x-6T P	grazing, improved pasture	wide range of heat loving crops, forages, cereal grains, grazing	soil moisture, soil depth, stoniness, topography	3M-4M	bunchgrass	soil moisture (early spring & late fall)
Gorge Creek	4M	lP;eS	soil moisture	6T P	N/A	grazing	N/A	topography, stoniness, frost-free period	5V	pinegrass	vegetation competition (summer)
Gisborne	5A-6A M M	D	climatic aridity, soil moisture	6P-4T T M	6T-3T P	grazing, forages	grazing, forages, cereal grains, range of vegetable crops	stoniness, topography, soil moisture	4M V	pinegrass	soil moisture, vegetation competition (summer)
Glimpse	7A	N/A	climatic aridity	5M-6T T P	3T-6T P P	grazing, improved pasture	grazing, forages, cereal grains, range of vegetable crops	soil moisture, topography, stoniness	3M	bunchgrass	soil moisture (spring & fall)
Gwenn	7A	N/A	climatic aridity	5M-6T P P	3P-6T P	grazing, improved pasture	forages, cereal grains, range of vegetable crops, grazing	soil moisture, stoniness, topography, frost-free period	2M	bunchgrass	soil moisture (spring & fall)

Table 17 (cont'd). Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Glossey	6A M	D;pP	climatic aridity, soil moisture	5M-6T P	2X-6T P	improved pasture, grazing	wide range of heat loving crops, forages, cereal grains, grazing	soil moisture, stoniness, topography	4M	bunchgrass and pniegrass	soil moisture, vegetation competition (early spring, late fall)
Hemp	4M-5M	lP	soil moisture, shallow soils	7R-6T T R	N/A	grazing	N/A	shallow soils, topography	5R V	pinegrass	shallow soils, vegetation competition (early summer)
Hallamore	5R-3S M	lP;eS	combination of minor factors, soil moisture, shallow soil	7T R	N/A	N/A	N/A	frost-free period, topography, shallow soils	5V	pinegrass	vegetation competition (summer)
Holden	5A-4M M	D;pP;lP	climatic aridty	6T-5M P P	6T-4P P	grazing, improved pasture	grazing, forages, cereal grains	topography, stoniness, soil moisture	4M V	pinegrass	soil moisture, vegetation competition (early summer)
Hotfish	5M-6U R R	lP;D	soil moisture, shallow soil, exposure	7T R	N/A	N/A	N/A	topography, shallow soils	5V	pinegrass	vegetation competition (summer)
Helmcken	5R-4M M	lP;eS	shallow soil, soil moisture	6T R	N/A	grazing	N/A	topography, frost-free period, shallow soils	5V	pinegrass	vegetation competition (summer)
Hooligan	3S-5R-6U M R	lP;D;eS	combination of minor factors, shallow soils, soil moisture, exposure	6T-7T R R	N/A	grazing	N/A	shallow soils, topography	5R V	pinegrass	shallow soils, vegetaiton competition (early summer)
Inkoiko	1-3M	D;wH	soil moisture	7T-5M-6T C P P	7T-4P-C M 6T-2X P	improved pasture, grazing to N/A	forages, cereal grains, grazing, range of vegetable crops, to N/A	topography, stoniness, soil moisture	5V to N/A	pinegrass to N/A	vegetation competition and/or vegetation type (summer)
Inkitsaph	2S-1	D;eS;wH	combination of minor factors, no limitation	6T P	N/A	grazing	N/A	topography, stoniness	4V-5V N/A	pinegrass, N/A	vegetation competition and/or vegetation type (summer)
Izman Creek	5A-2S M	D;pP	climatic aridity, soil moisture, combination of minor factors	6T-5M P P	6T-3P P M	grazing, improved pasture	range of heat loving crops (except root crops) grazing, improved pasture	topography, stoniness, soil moisture	5V M	pinegrass (bunch-grass)	vegetation competition, soil moisture (spring and summer)
Kha Lake	4M R	D;eS	soil moisture, shallow soils	7T R	N/A	N/A	N/A	topography, shallow soils, rock outcrops	N/A	N/A	vegetation competition and/or vegetation type (summer)

Table 17 (cont'd). Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Kanaka	6A-5R-2S R M	D	climatic aridity, soil moisture, shallow soils	6T-7R R	N/A	grazing	N/A	topography, shallow soils, rock outcrops	4V R	pinegrass	vegetation competition, rock outcrops (summer)
Klowa Creek	4M-7R R	D;eS	soil moisture, shallow soils, rock outcrops	6T-7R R	N/A	grazing	N/A	topography, shallow soils, rock outcrops	N/A	N/A	vegetation competition and/or vegetation type, rock outcrops (summer)
Kumkan	5H-7R R	alF;eS	snow depth, short growing season, shallow soils, rock outcrops	7T R	N/A	N/A	N/A	climatically and topographically unsuitable, shallow soils, rock outcrops	N/A	N/A	topography, vegetation type, rock outcrops (summer)
Klept Lake	5H-7R R	lP;eS	snow depth, short growing season, shallow soils, rock outcrops	7T R	N/A	N/A	N/A	climatically and topographically unsuitable, shallow soils, rock outcrops	N/A	N/A	topography, vegetation type, rock outcrops (summer)
Kerr	5R-4M M	lP;eS	shallow soils, soil moisture	6T;6T R	N/A	grazing	N/A	frost-free period. topography, shallow soils	5V-4U	pinegrass (alpine grasses)	vegetation competition, short growing season (summer)
Kwoiek	5R-6U M R	D;lP;eS	shallow soils, soil moisture, exposure, rock outcrops	7T-6T R R	N/A	N/A - grazing	N/A	topography, shallow soils, rock outcrops	N/A	N/A	rock outcrops, vegetation competition
Lac du Bois	7A	N/A	climatic aridity	5M	2N-1-4T R	improved pasture, grazing	salt tolerant crops, forages, cereal grains	soil salinity, alkalinity, topography	3N	bunchgrass (salt tolerant forages)	soil salinity (spring & fall)
Laurel	4M	lP;eS	soil moisture	7C	N/A	N/A	N/A	frost-free period	5V	pinegrass	vegeataion competition (summer)
Lundbom	7A	N/A	climatic aridity	6T-5M-7T	6T-3T-7T	grazing, improved pasture	range of heat loving crops, forages, ceral grains	topography, soil erosion, shallow soil, soil moisture	3A	bunchgrass	climatic aridity (early spring & late fall)
Laluwissen	7A	N/A	climatic aridity	5M-6T T E	3T-6T D E	grazing, improved pasture	range of heat loving crops, forages, cereal grains	topography, soil erosion, soil impermeable layer (structure), soil moisture	2a	bunchgrass	climatic aridity (spring & fall)
Meander	7A	N/A	climatic aridity	4M-6T R	4T-3C-6T R	forages, grazing, cereal grains	forages, cereal grains, cool loving crops	topography, frost-free period, rock outcrops	1	bunchgrass	no limitations except where rock outcrops (early summer)

Table 17 (cont'd). Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Medicine	7A	N/A	climatic aridity	4T-6T;6T E R	4T-3C-6T R	forages, grazing, cereal grains, range of vegetables	forages, cereal grains, cool loving crops	topography, frost-free period, soil erosion, shallow soil	1	bunchgrass	minor calcareous limitation (spring & fall)
Maiden	5A-6A M	D;pP	climatic aridity, soil moisture	5M-6T P R	3P-6T T R	grazing,. improved pasture	forages, cereal grains, range of heat loving crops	soil moisture, stoniness, topography, shallow soil	3V A	bunchgrass (pinegrass)	vegetation competition, climatic aridity, (spring & fall)
Mellin	4M-3S-5R M	lP;eS	soil moisture, combination of minor factors, shallow soil	6P;6P T R	N/A	grazing	N/A	frost-free period, stoniness, topography, shallow soil	5V	pinegrass	vegetation competition (summer)
McKnight	7A	N/A	climatic aridity	5T-6T;6T M E R	4T-6T-6T E R	grazing, improved pasture	forages, cereal grains, grazing	topography, soil erosion, shallow soil	3A	bunchgrass	climatic aridity (early spring & fall)
McLaren	6R-4M-7U R	D;lP	shallow soil, soil moisture, exposure (aspect)	5T-6T P R	N/A	improved pasture, grazing	N/A	topography, stoniness, shallow soil	2V-3A V	pinegrass	vegetation competition, climatic aridity (summer)
Minnie	5A-4M-5R M	D;lP	climatic aridity, soil moisture, shallow soil	6T-5T R P	N/A	grazing, improved pasture	N/A	topography, shallow soil, stoniness	2V	pinegrass	vegetation competition (summer)
McQueen	7A	N/A	climatic aridity	3T-5T-6T M M R	3T-4T-6T P R	improved pasture, forages, cereal grains, range of vegetables, grazing	range of heat loving crops, forages, cereal grains, grazing	topography, soil moisture, stoniness, shallow soil	2A	bunchgrass	climatic aridity (spring & fall)
Mossey	7A	N/A	climatic aridity	3P-6T-6T M P R	2P-3P-6T T P -6T R	range of vegetable crops, forages, cereal grains, grazing	range of heat loving crops, forages, cereal grains, grazing, pasture	stoniness, soil moisture, topography, shallow soil	1	bunchgrass	no limitation (spring & fall) (early summer)
Oregon Jack	7W	N/A	high water table, periodic inundation	6C W	5C W	grazing	grazing, forages	frost-free period, fluctuating water table	3W	sedges	fluctuating water table, inundation
Placid	5R-4M M	lP;eS	shallow soil, soil moisture	6C R	N/A	grazing	N/A	frost-free period, shallow soil	5V-3V	pinegrass	vegation competition (summer)
Rayonier	7W I	N/A	high water table, periodic inundation	6W-6C I W	6W-6C I W	grazing	grazing	frost-free period, fluctuating watertable, periodic inundation	3W I	subalpine forage, sedges	fluctuating watertable, periodic inundation (summer)

Table 17 (cont'd). Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Rennie	5M-4W A	D;pP;bCo	soil moisture, climatic aridity, fluctuating watertable	4I-3W W I	4I-3W W I	forages, cereal grains, vegetables, improved pasture	forages, cereal grains, vegetables, improved pasture	periodic inindation, fluctuating watertable	2V-1	riparian vegetation	vegetation competition (summer & fall)
Rail	7W	N/A	high watertable	6C W	5C	grazing	grazing, forages	frost-free period, fluctuating watertable	3W	sedges	fluctuating watertable(summer)
Saatin	3S-2S	eS;alF	combination of minor factors	7T C	N/A	N/A	N/A	topography, climatically unsuitable	N/A	N/A	rock outcrops, vegatation competition and/or vegetation type
Struthers	3S-4M	D;lP	combination of minor soil factors, soil moisture	5T-6T P P	5T-6T P P	improved pasture, grazing	improved pasture, grazing	topography, stoniness	3V	pinegrass	vegetation competition (summer)
Stolle	4M-3S	lP;D	soil moisture, combination of minor soil factors	6P T	N/A	grazing	N/A	frost-free period, stoniness, topography	5V-3V	pinegrass	vegetation competiton (summer)
Shumway	7A	N/A	climatic aridity	5M	1-2T-3T D D	improved pasture, grazing	wide range of heat loving crops, forage, cereal grains, pasture	topography, soil impervious layer (structure), soil moisture	3A	bunchgrass	climatic aridity (early spring & late fall)
Soues	7A	N/A	climatic aridity	6T-7T R	N/A	grazing	N/A	topography, shallow soil	3A-5T R R	bunchgrass	climatic aridity, shallow soil, topography (spring & fall)
Spius Creek	4M-5R-3S M	D-pP-lP	soil moisture, shallow soil, combinaiton of minor soil factors	6T-6T R	N/A	grazing	N/A	topography, shallow soil	3V	bunchgrass and pinegrass	vegetation competition (summer)
Succour	5M-6U A R	D;pP	soil moisture, climatic aridity	5M-6T P	2M-1-6T P	improved pasture, grazing	wide range of heat loving crops, forages, cereal grains	soil moisture, topography, stoniness	4V M	bunchgrass	vegetation competition, soil moisture, (early spring - late fall)
Scuitto	7A	N/A	climaitc aridity	5M F	3F-2F-4F D	improved pasture, grazing	range of heat loving, lime torlerant crops, forages, cereal grains	soil fertility (high alkalinity), soil impervious layer (structure)	3A N	bunchgrass	climatic aridity, soil fertility (early spring & late fall)
Tisdall	4M	lP;eS	soil moisture	6C	N/A	grazing	N/A	frost-free period	5V-3V	pinegrass	vegetation competition (summer)

Table 17 (cont'd). Typical Capability Ratings for Forestry, Agriculture and Grazing

Soil Association	Forestry			Agriculture					Grazing		
	Forest Capability	Indicator Species	Limiting Factors	Agriculture Capability		Crop Range		Limiting Factors	Grazing Capability	Forage Type	Limiting Factors (season of use)
				Unimproved	Improved	Unimproved	Improved				
Tullee	7A	N/A	climatic aridity	4T-6T-6T M P R	3T-2P-6T; P P 6T R	forages, cereal grains, grazing	range of heat loving crops (except root crops), forages, cereal grains, grazing	topography, stoniness, shallow soil	1	bunchgrass	no limitation (spring & fall)
Trachyte	7A	N/A	climatic aridity	3M-5T-6T P R	2C-5T-6T P R	range of vegetable crops, forages, cereal grains, grazing	range of vegetable crops, forages, cereal grains, grazing	frost-free period, topography, stoniness, shallow soil	1	bunchgrass	no limitation (spring, early summer & fall)
Tole	3S-5H R	lP;eS	combination of minor soil factors	7C-6T T R	N/A	grazing	N/A	frost-free period, shallow soil, topography	5V-4V	pinegrass	vegetation competition (summer)
Timber	5A-6A R	D;pP	climatic aridity, shallow soil	6T-5T R M	6T-5T-3T R P	grazing, improved pasture	grazing, improved pasture	topography, stoniness, shallow soil	3V A	bunchgrass	vegetation competition, climatic aridity (spring & fall)
Tsintsunko	5H-4H R	eS;alF	shallow soil accumulation of deep snow, and/or cool growing season	7C	N/A	N/A	N/A	frost-free period	5V	subalpine forage	vegetation competition (summer)
Trapp Lake	7A	N/A	climatic aridity	4M-6T T P	3T-6T;6T P R	forages, cereal grains, grazing	range of heat loving vegetables, forages, cereal grains, grazing	topography, stoniness	2A	bunchgrass	climatic aridity (spring & fall)
Tranquille	7A	N/A	climatic aridity	5M-6T-6T T F R	3T-4T-6T; P E 6T R	improved pasture, grazing	range of heat loving crops, forages, cereal grains, grazing	topography, stoniness, soil erosion, shallow soil	3A	bunchgrass	climatic aridity (early spring & late fall)
Teman	4M-7W	lP;eS	soil moisture, fluctuating watertable, (poor drainage)	6T-5C P	6T-5C P	grazing, improved pasture	grazing, improved pasture	topography, frost-free period, shallow soil	5V	pinegrass	vegetation competition (summer)
Teather	3S-4M-5R M	D;lP	combination of minor soil factors, soil moisture, shallow soil	5T-6T P P	5T-6T P P	improved pasture, grazing	improved pasture, grazing	topgraphy, stoniness	3V-2V	pinegrass	vegetation competition (summer)
Truda Mountain	4M-3S-5R M -6U R	lP;eS	soil moisture, combination of minor soil factors, shallow soil, exposure	6C-6T R	N/A	grazing	N/A	frost-free period, topography, shallow soil	5V-3V	pinegrass	vegetation competition (summer)
Tunkwa	4M-5R M	D;lP;eS	soil moisture, shallow soil	6T-5M R T	6T-4T R P	grazing, improved pasture	grazing, forages, cereal grans	frost-free period, topography, stoniness	2V-3V	pinegrass	vegetation competition (summer)

5.2 Soil Fertility of Sampled Soil Associations of the Ashcroft Map Area

5.2.1 Discussion of Soil Chemistry and Fertility Considerations

A brief discussion of various soil properties is given to aid in interpretation of chemical data. Most of the discussion is taken from Sprout and Kelly (1963) and was initially written for agriculture, however, it also generally applies to rangeland soils and soils for forestry. This portion of the report is included to provide a better understanding of the columns in Table 21 which are based on interpretation of laboratory results for sampled soil associations.

pH or Soil Reaction

Pure (distilled) water has a pH of 7, a value of which represents neutrality. Values less than pH 7 denote acidic conditions while those above pH 7 denote alkaline conditions. The pH range for soils may vary from about 3 to 10. Soil parent materials in the Ashcroft area range mainly from pH 5.5 to 8.5.

Soils with a pH value of 7.5 to 8.0 usually contain free carbonates of calcium and magnesium, while those with pH values of 8.5 or more generally contain considerable amounts of exchangeable sodium and sodium carbonate. Plants vary in their ability to grow at different pH values, and while no single factor may be responsible for limiting growth, an important consideration is nutrient availability. For example, in alkaline soils, growth may be limited by the low availability of phosphorus, zinc, iron, manganese, and boron. Soil rooting zones with reactions of 6.2 to 7.5 are practically neutral and this represents the ideal situation for most crops. Between the pH range of 7.5 to 8.5, the growth of many crops may be limited and only alkaline tolerant crops should be grown. Soil rooting zones with pH values above 8.5 are strongly alkaline.

Organic Matter

The content of organic matter in the soil may vary from less than one percent in mineral soils to as high as one hundred percent in organic soils. The maintenance of an adequate supply of organic matter is one of the most important requirements of soil fertility and management.

Organic matter contributes to plant growth through its effect on the physical, chemical and biological properties of the soil. Most, if not all, of the nitrogen and some of the phosphorus and sulphur are held in organic combinations. However, the organic form of these nutrients must be mineralized before being utilized by higher plants, a process accomplished by the microbiological population of the soil.

The frequent additions of easily decomposable organic residues cause the synthesis of complex organic compounds that bind soil particles into structural units called aggregates. These aggregates help maintain a loose, open granular condition which improves the tilth, increases resistance to erosion and facilitates the movement of air and water through the soil. In short, the presence of adequate amounts of organic matter in the soil improves the structure of both coarse and fine textured soils,

increases the moisture holding and cation exchange capacities, and creates a favorable carbon dioxide-oxygen relationship which is beneficial to plant root development.

Phosphorus

Phosphorus is one of the major elements essential for plant growth. Most of the total phosphorus occurs in forms not immediately available to the growing plant. Available soil phosphorus originates from the breakdown of soil minerals, soil organic matter, or from previous additions of phosphate fertilizer. Only inorganic phosphorus is utilized by higher plants, and organic phosphorus forms must first be mineralized by organisms.

The chemistry of phosphorus is complex, but a knowledge of a few basic principles will aid in its utilization.

One characteristic feature of soil phosphorus is its low solubility in the soil solution. Phosphorus applied as fertilizer changes into less soluble compounds similar to the native forms present. This process is called fixation. The nature of the fixation may affect phosphorus fertilizer efficiency differently on different types of soil. Acid soils contain a large excess of active iron and aluminum while alkaline soils an excess of calcium. These elements combine with water soluble phosphorus producing less soluble compounds. Iron and aluminum phosphates are least soluble at pH 4, with their maximum availability in the pH range of 6.5 to 7.0. As the pH increases from 7 to 8.5 in alkaline soils, the availability of phosphorus decreases as a result of the formation of calcium phosphates.

The fixation processes take place quite rapidly so that applied phosphorus does not move any appreciable distance through the soil. This means that the plant root must move to the phosphorus rather than the phosphorus moving to the plant root as is the case for nitrogen. Consequently, phosphorus should be distributed throughout the cultivated layer either by discing or drilling. Top-dress applications are beneficial primarily when the crop has abundant feeding roots in the upper one or two inches of soil, a condition which occurs most commonly in humid areas or in irrigated soils. In most dry farmed soils, the roots tend to concentrate at lower depths, although this is somewhat dependent on the type of plant and rooting habit.

Nitrogen

Nitrogen is a major element of special importance because it is utilized by plants in rather large amounts. It is fairly expensive to supply, and is easily lost from the soil. A major factor in successful agriculture or forestry is the ability to maintain an adequate nitrogen supply.

The atmosphere is the ultimate source of soil nitrogen. Higher plants cannot utilize gaseous nitrogen directly and it must first be combined with other elements, a process called nitrogen fixation. One of the chief methods of this transfer is through the agency of microorganisms inhabiting the soil. The nitrogen-fixing aerobic bacteria known as *Azotobacter* and the anaerobic bacteria, *Clostridia,* are responsible for fixing large quantities of atmospheric nitrogen. The bacteria, *Rhizobia,* living in symbiotic relationship with legumes, and other plants (for example alder) also makes a considerable contribution to the total nitrogen content of soils. Aside from the nitrogen attributable to microbiological activity some is washed into the soil each year as a result of electrical storms.

Despite the large amounts of nitrogen released in the soil each year, the reserve of available nitrogen is never very great. This, in conjunction with the very large demand for crop production, necessitates development of an adequate fertilizer program. The addition of green cover crops and crop residues enhances the nitrogen and organic matter content of the soil. In a general way it can be said that 75 to 100 pounds of nitrogen per acre should be available for crop growth. Management practices should be such that a moderate level of available nitrogen is always present in the soil for crop use.

The dependence of nitrogen availability on microbial activity makes interpretation of the analytical values even more difficult than is the case for available phosphorus and potassium. The probable response of crops to nitrogen fertilizers can be determined primarily by taking into account previous yields and cropping history, kinds of residues returned to the soil, adequacy of other nutrients, the weather and soil conditions. Analytical values of total nitrogen can serve only as a partial guide, and the levels shown in Table 18 may be used as rough guidelines.

Table 18. Total Nitrogen Classes used to Rate Soil Fertility

Very low	<0.10%
Low	0.10-0.25%
Medium	0.25-0.40%
High	>0.40%

Cation Exchange Capacity and Exchangeable Cations

The mineral and organic particles of soils exhibit cation exchange properties. The particle surfaces are negatively charged, and positively charged cations are adsorbed on the particle surface to counteract their negative charge. The soil is a heterogeneous system of solid, liquid and gaseous components in various proportions. The solid component of the soil is made up of primary minerals, clay minerals and hydrous oxides, together with organic matter and living organisms. In this heterogeneous system the soil solution acts as the medium by which the exchange of ions between members of the different phases are made possible, even when the reactants are not in direct contact.

This ability of the soil to hold exchangeable cations is termed the cation exchange capacity, and is expressed as milli-equivalents of cations required to neutralize the negative charge of 100 grams of soil at pH 7. Depending upon the content of organic matter and the type and content of clay minerals present, the cation exchange capacities range from practically nil to over 100 milli-equivalents per 100 grams of mineral soil. One milli-equivalent of calcium per 100 grams of mineral soil is roughly equivalent to 170 kilograms of calcium per acre to plow depth or the amount of calcium in 420 kilograms of pure limestone.

The cation exchange properties of soils influence plant nutrition. Nutrient cations held as exchangeable bases are in an available state, but not easily leached from soils. Since the cation exchange capacity of a soil depends on the content of organic

matter and clay, there is variation in behavior between soil types, and between soil horizons of the same profile. Table 19 shows how cation exchange capacities have been used to assist in rating soil fertility.

Hydrogen, aluminum, calcium, magnesium, potassium, and sodium are the most abundant exchangeable cations. Their proportions vary from soil to soil, depending on inherited characteristics and past management practices. Hydrogen and aluminum are the predominant exchangeable cations in most acid soils. Calcium and magnesium are most common in nearly neutral soils, while strongly alkaline soils contain large proportions of exchangeable sodium in addition to calcium and magnesium. The strength with which the ions are bound on the particle surface depends on the nature of the ions and of the particle charge.

Exchangeable potassium levels constitute an important indication of the potassium supplying power of a soil. The exchangeable potassium is in equilibrium with less available mineral and fixed forms. As exchangeable potassium is removed by plants, potassium is gradually released from the less available forms to restore the equilibrium. The maintenance of an adequate exchangeable potassium supply therefore depends upon the amount in reserve and the rate of release.

Exchangeable sodium is an important constituent that can profoundly affect the physical properties of a soil. If the exchange complex contains appreciable amounts of sodium, dispersion of soil particles will occur. Such a condition causes the soil to puddle, promotes poor aeration and water availability; puddling is most detrimental in fine textured soils. If the exchange complex becomes more than 10 to 15% saturated with sodium, nutritional disorders are likely to occur.

Table 19. Cation Exchange Capacity Classes used to Rate Soil Fertility

Cation Exchange Capacity: measured in meq/100 g of soil.

<7.5	–	very low	–	coarse texture
7.5-10	–	low	–	coarse texture
10-30	–	medium	–	medium texture (1:1 lattice clays)
30-80	–	high	–	fine texture (2:1 lattice & amorphous clays)
>80	–	very high	–	organics

Base Saturation

Base saturation is a measure of how many of the exchange sites within the soil complex are occupied by calcium, magnesium, sodium and potassium. If all exchange sites are occupied by cations then the soil is 100% base saturated. Generally the higher the percent base saturation the more fertile the soil tends to be. A rough guide to interpreting base saturation for soil fertility is shown in Table 20.

Table 20. Base Saturation Classes used to Rate Soil Fertility

<30%	–	very low
30-50%	–	low
50-80%	–	medium
80-95%	–	high
95-100%	–	very high

Conductivity

The content of soluble salts in the soil solution is estimated electrically through conductivity measurements. The greater the conductivity, the greater the content of soluble salts present in the soil solution. The greater the soluble salt concentration, the greater the osmotic pressure against which plants must draw their nutrients. Conductivity measurements are estimated in terms of milliseimens per square centimetre @ 25°C. Concentrations of soluble salts of four or more milliseimens/cm are considered harmful to normal plant growth although the amount of damage at any particular level varies with the salt tolerance of the crop.

Soluble Cations

In regions of low precipitation, soluble salts accumulate in soils which are subject to seepage and restricted drainage. The salts usually present consist of sulphates and chlorides of calcium, magnesium and sodium. Such salts produce harmful effects to plants by increasing the salt content of the soil solution, and in some cases by increasing the degree of saturation of the soil exchange complex with sodium. The latter effect occurs when the soluble constituents consist largely of sodium salts, and is of a more permanent nature since exchangeable sodium usually persists after the soluble salts are removed.

Empirical equations have been devised for expressing the relationship between soluble and exchangeable cations. By this method the exchangeable-sodium-percentage can be calculated using the values obtained for calcium, magnesium and sodium in a saturated soil extract. Depending upon the conductivity and kinds of salts present, the soils may be classed as follows:

a) Saline Soils — the conductivity values are in excess of 4 milliseimens/cm, but the exchangeable-sodium-percentage is less than 15. In no case does the pH exceed 8.5;

b) Non-saline – Alkali Soils — the exchangeable-sodium-percentage of these soils exceeds 15, but the soluble salt contents are low. Usually the pH exceeds 8.5;

c) Saline-Alkali Soils — the conductivity values are greater than 4 milliseimens/cm, and the exchangeable-sodium-percentage exceeds 15. The pH readings may vary considerably, but are commonly less than 8.5.

The kinds and relative amounts of salt a soil contains places it in one of the classes described above and governs the recommendations made regarding its reclamation. The reclamation of saline soils requires leaching only, providing drainage is adequate.

Replacement of the exchangeable sodium is required for the reclamation of non-saline-alkali soils, and this can be accomplished by the application of an amendment such as gypsum or sulphur. Saline-alkali soils require both leaching and the addition of an amendment for their reclamation.

Fertility estimates for the soil associations in Table 21 can be used as a general guide to soil fertility. They are not however, meant to be used as fertilizer recommendations. Fertilizer recommendations should be based on analysis of soil samples from the location to be fertilized.

5.2.2 Estimated Soil Fertility of Sampled Soil Associations of the Ashcroft Map Area

Soil fertility of sampled soil associations in Ashcroft map area is determined partly through analysis of chemical data such as soil organic matter content, phosphorus, nitrogen, pH (reaction), cation exchange capacity, and base saturation. Also, subjective rate of weathering (potential release of nutrients from unweathered parent material), soil depth (to unweathered parent material, rock, or calcareous horizon), rate of nutrient availability (cycling), biomass production, soil texture and structure, and precipitation (seasonal available water), are other factors used in a qualitative evaluation of each soil to assist the development of the columns titled 'Probability of Soil Degradation' and 'Soil Response to Management Practises' in Table 21.

It is possible to have a soil with a low pH, and a moderate to high cation exchange capacity that has a low fertility rating. In this case, not all of the soil exchange sites are occupied by exchangeable cations; therefore, the addition of fertilizer and correction of pH should improve soil fertility. On the other hand, it is possible to have a soil with near neutral pH, a low cation exchange capacity, and near 100% base saturation. This soil may have a low to moderate fertility status, but it does not have any significant potential for improvement. Also, a soil may have a low pH, low cation exchange capacity and a low base saturation but remain highly productive due to a high rate of nutrient cycling or the presence of nutrient rich seepage.

There are many considerations with respect to soil fertility, such as the above, which make interpretation difficult, however, Table 21 identifies some of the soil characteristics which affect fertility and indicate probability of site degradation or response to management. The parameters describing reaction, salinity, and alkalinity are taken from The System of Soil Classification for Canada, 1974 (revised). The following limits were used to describe the soil depth and soil reaction. The limits for cation exchange capacity and base saturation are given in Tables 19 and 20, respectively.

Soil Depth

Soil depth is defined by the limit of chemical and physical weathering or the presence of bedrock.

<30cm	–	very shallow
20-50 cm	–	shallow
50-100 cm	–	moderate
>100 cm	–	deep

Soil Reaction (pH)

pH Value		Reaction Class
<4.5	–	Extremely acid
4.6-5.0	–	Very strongly acid
5.1-5.5	–	Strongly acid
5.6-6.0	–	Medium acid
6.1-6.5	–	Slightly acid
6.6-7.3	–	Neutral
7.4-7.8	–	Mildly alkaline
7.9-8.4	–	Moderately alkaline
>8.5	–	Strongly alkaline

It must be mentioned that the fertility status of individual farms and fields may vary considerably according to past management practices or variations in the soils and the analyses made in this study are too few and too limited to be used for fertilizer recommendations.

Table 21. Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – Alkalinity***	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Abbott**									
Bm	very strongly acid		very low	low				High. Readily leached; improverished soil with little potential for enhancement.	Incorporate LH into Bm and Ae to preserve organic matter, nutrients and improve moisture retention; exchange complex is leached of nutrients (except K); CEC offers little retention capability, however, a weak Bt horizon at 74 cm (29 in) helps retard leaching and loss of soil moisture beyond rooting depth.
Ae	very strongly acid		medium	very low	deep	low/very low	low/very low		
AB	very strongly acid		high	very low					
C (classification deviant)	strongly acid								
Abbott**									
LFH	extremely acid		very high	very high	shallow	low/very low	low	High. Readily leached; nutrition of LFH demonstrates the higher level of nutrition of the partially and completely decomposed forest litter compared with the mineral horizons below.	High. Avoid fire; encourage minor vegetation;' incorporate organic matter into Bm horizon to preserve nutrition and improve moisture retention; shallow soil; prevent erosion; soil has little or no potential for improvement in productivity.
Bm	strongly acid		medium	very low					
BC	strongly acid		low	low					
C	strongly acid								
Aylmer									
Ah	slightly acid		very high	medium			moderate	High. Readily leached; minimize loss of organic matter in Ah.	Leaching of high Ca in Bm horizon desirable, avoid excessive leaching, however; maintain organic matter in Ah horizon for nutrient availability and moisture retention.
Bm	neutral		very high	medium	shallow	moderate			
Ck	mildly alkaline		very high	very low					
Cache Creek									
Ahk_1	mildly alkaline		vey high	medium				High. Leaching of free lime desirable, Na levels in Ck could lead to problems under poor management; maintain organic matter levels in Ahk for nutrition and moisture retention.	Low. High Ca levels may result in deficiencies of P and Fe, wide Ca:Mg and Ca:K ratios may induce deficiencies in Mg and K, also B, Cu and Zn could be a problem; leaching of Ca will help alleviate problems-excessive leaching to be avoided, however.
Ahk_2	neutral		very high	medium	shallow	high	high		
Ck	mildly alkaline	mildly to moderatly alkaline	very high	very low					
Carabine**									
Ah	slightly acid		very high	medium/ low		high		High. Maintain organic matter in Ah for nutrition and moisture retention; easily leached, very shallow to calcareous (Cca) horizon; a productive grassland or irrigation soil; prevent erosion of topsoil.	High. K levels in Ah result from decompositon of grass litter; K in Bm is leached; K in Cca and Ck is likely unavailable due to high free lime; lime in Cca and Ck will depress uptake of P and Fe; B, Cu and Zn may also by problems.
Bm	neutral		very high	medium/ low	very shallow	moderate			
Cca	mildly alkaline	moderately to strongly alkaline	very high	medium/ low		moderate	moderate		

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – *** Alkalinity	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Carabine**								High.	High.
Ap	neutral		very high	medium		high	high	This cultivated soil may demonstrate the effects of improper use of irrigation (water may also be calcareous); soil has a high fertility potential and requires leaching of Ca (free lime).	High Ca levels indicate an abundance of free lime in all horizons (at least to the Ck2) which is depressing the availability of Mg; the Ap has reasonable levels of K but it is doubtful that plants can absorb much of it; pH levels (along with the Ca) suggest that P and Fe will be deficient and possibly B, Cu & Zn.
Bmk	neutral		very high	medium	shallow	moderate			
Ck1	mildly alkaline	moderately to strongly alkaline	very high	medium/ low		moderate			
Carson								Moderate.	Low to moderate.
Ae	neutral		very high	medium			high	Easily leached; incorporate LH into Ae to preserve organic matter and nutrients and increase moisture retention capability.	Avoid fire; encourage minor vegetation, particularly native grasses; nutrient complex near capacity; climatic aridity is major limitation to productivity.
Bm	neutral		very high	medium	mode-rate	high			
Ck2	mildly alkaline	moderately calcareous		low					
Cavanaugh								High.	Moderate.
Ae	medium acid		very high			moderate to high	moderate*	Easily leached; incorporate organic matter (LH) into Ae; increased moisture retention will enhance minor vegetation and survival or seedlings.	Avoid fire; encourage minor vegetation after harvest (or fire) to regenerate soil; nutrient status may in part be due to seepage of nutrient rich moisture; nutrient complex near capacity.
Bm	slightly acid		very high	medium	mode-rate to deep				
Ck2	mildly alkaline	weakly calcareous							
Cedarbench								High.	High.
Ae	extremely acid		very low	low	deep	low	very low*	Easily leached; prevent erosion.	Avoid fire & incorporate LH into Ae horizon; maintain minor vegetation to regenerate soil.
Bf	very strongly acid		very low	medium					
Chasm								Moderate.	Moderate.
Aej	medium acid		very high					Easily leached; incorporate LH into Ae to preserve organic matter and nutrients and improve moisture retention.	Avoid fire; incorporate LH into Ae horizon to help regrade soil; nutrient complex near capacity; high Ca may induce deficiencies of P and K; enhancement may be achieved by increased nutrient cycling.
Bm	medium acid		very high	medium	deep	high	moderate*		
Ck	neutral		very high						
Clemson								High.	High.
Ah	very strongly acid							Leached soil; incorporate LH and Ah into Ae to maintain organic matter; soil is seriously impoverished considering the high base status of the parent rock.	Avoid fire; prevent erosion; encourage minor vegetation to help regrade soil; productivity largely resulting from seepage of moisture and nutrients over an extended period.
Ae	extremely acid		low	medium	very shallow	high	low*		
Bf	very strongly acid		low	medium					
C	very strongly acid			medium					

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – *** Alkalinity	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Commonage									
Ah	neutral		very high			moderate	moderate	High. Easily leached; maintain organic matter in Ah to increase or maintain moisture retention and nutrient availability.	High. Nutrient complex near capacity; high Ca may induce deficiencies of Mg and K and probably P.
Bm	slightly acid		very high	medium	mode-rate				
Ck	neutral		very high						
Conant									
Ahe	medium acid		very high	very low				High. Easily leached; incorporate litter into Ahe to preserve organic matter and improve moisture retention.	High. Avoid fire; encourage minor vegetation to help regrade soil; nutrient complex near capacity, but CEC is very low; little or no potential for enhancement.
Bm1	slightly acid		very high	medium	deep	low	low		
Bm2	slightly acid		very high	very low					
C	neutral								
Courtney									
Ah	neutral		very high	medium				High. Maintain organic matter in Ah for nutrition and moisture retention; prevent erosion of topsoil; very shallow soil; avoid exposure of calcareous C horizon.	High. High base status, particularly Ca, suggests need to leach with non-saline, non-calcareous irrigation water but not excessively.
Bm	slightly acid		very high	medium	very shallow	moderate	moderate to high		
Cca	mildly alkaline		vey high	medium					
Ck	mildly alkaline	moderately alkaline							
Courtney**									
Ah	neutral		very high	medium/ high				High. Readily leached; improve organic matter in Ah; prevent erosion of topsoil; shallow soil; avoid deep cultivation and exposu of clacareous B and C horizons.	High. Excessive K levels may induce deficiencies of Ca and Mg although they are present in adequate amounts; increased productivity of native grasses and cultivated crops can be achieved by using non-saline and non calcareous water for irrigation; P, Fe, B, Cu and Zn may be deficient.
Bmk	mildly alkaline	weakly calcareous	very high	high/ medium	shallow	high	high		
IICca (Classifi-cation deviant)	mildly alkaline	weakly calcareous, moderately alkaline, weakly saline	very high	medium/ high					
Courtney**									
Ah	neutral		very high	medium/ high				High. Maintain organic matter in Ah for nutrition and moisture retention; prevent erosion of topsoil and deep cultivation to minimize exposure of calcareous C horizon; irrigate to leach excess salts with non-saline and non-calcarcareous water.	High. High K levels may induce Ca and Mg deficiency; however high levels of Ca and Mg may compensate; productivity of native grasses and cultivated crops will increase with irrigation; pH and Ca levels suggest deficiencies of P, Fe, B, Cu and Zn may occur.
Bm	mildly alkaline		very high	high/ medium	very shallow	high	high		
Cca	mildly alkaline	weakly calcareous	very high	medium/ high					
Ck	mildly alkaline	weakly calcareous, strongly alkaline, weakly saline	very high	medium					
Crown Mountain									
Ahe	neutral		very high	high				High. Readily leached; leaching of free lime highly desirable; maintain organic matter in the Ahe for nutrition and moisture retention; avoid erosion of Ahe.	Moderate to high. Avoid fire; encourage minor vegetation to induce leaching of high Ca levels; high Ca may be depressing availability of Mg and K, P and Fe. Availability of B, Cu and Zn may also be a problem.
Ck1	mildly alkaline		very high	medium	very shallow	high	moderate		
Ck2	mildly alkaline	mildly to moderately alkaline	vey high	medium					

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – Alkalinity ***	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Curnow								Moderate.	High.
Ae	strongly acid		high	medium	deep	high	moderate*	Readily leached.	Incoporate LH into Ae horizon; prevent erosion.
Bm	strongly acid		high	low					
Ck	neutral								
Dominic								High.	Moderate.
Apk	neutral		high/very high	medium				Leaching of Ca desirable but low CEC suggests high sensitivity to excess leaching.	Current free lime and pH levels suggest induced deficiencies of P and K; Mg may also be deficient due to wide ratio to Ca; B, Cu and Zn may also be problem; avoid calcareous irrigation water.
Bmk	neutral		high/very high	low	shallow	moderate to low	moderate		
Ck	slightly acid		high/very high	very low					
Flat Creek								High.	Moderate.
Apk	neutral		high/very high	low to medium				Readily leached; maintain organic matter for fertility and moisture retention; avoid calcareous irrigation water.	Irrigation to leach free lime desirable; high Ca may induce P, Fe and K deficiency; Mg may also be deficient due to wide ratio to Ca; B, Cu and Zn may also be a problem.
Bmk	neutral		high/very high	low	mode-rate to deep	moderate	moderate		
Ck1	mildly alkaline		high/very high	very low					
Fleet Creek								High.	High.
Ae	medium acid		high	very low				Readily leached; high base saturation masks very low CEC; maintain organic matter in Ae to preserve nutrients and aid moisture retention.	Avoid fire; prevent excessive leaching; encourage minor vegetation (mainly native grasses); Ca:K andMg:K ratios suggest induced deficiency of K; soil has little or no natural potential for increased production.
Bm	medium acid		high	very low	very shallow	moderate	low		
C	neutral		very high	very low					
Frisken								High.	Low.
Ap	mildly alkaline		very high	medium to high	mode-rate		high	Control of watertable essential to ensure drainage and leaching of excess salts; avoid calcareous irrigation water	Drainage and irrigation to encourage leaching of excess Ca and Na; high Ca and Mg to K ratios suggest induced K deficiency and deficiencies in P and Fe; B, Cu and Zn may also be a problem; reparian vegetation naturally productive.
Cskgj1	moderately alkaline		very high	medium		high			
Cskgj2	moderately alkaline		very high	medium					
Gisborne								Low.	Moderate.
LH	very strongly acid							Readily leached; maintain organic matter by incorporating LH into Ae.	Avoid fire; encourage minor vegetaion to help regrade soil; soil has low natural fertility, and low capacity for improvement.
Ae	slightly acid		very high	very low	shallow	moderate	low		
Bm	slightly acid		very high	very low					
C	Slightly acid		very high	very low					
Glimpse								High.	High.
Ah	slightly acid		very high	medium/ low	mode-rate to deep	low	moderate to low	Readily leached; maintain organic matter in Ah for nutrition and moisture retention; majority of nutrients and CEC is in the Ah horizon.	Nutrition appears balanced; while the exchange complex is saturated the CEC is low, therefore the soil has little potential for increased production – except by increasing the rate of nutrient cycling with fertilization and irrigation.
Bm	slightly acid		very high	very low					
Ck (classification deviant)	neutral	mildly to moderately alkaline							

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – *** Alkalinity	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Glimpse**								Moderate.	Moderate.
Ah	neutral		very high	medium				Maintain organic matter in Ah; prevent erosion of topsoil.	High K levels in Ah may induce deficiencies in Ca and Mg; irrigation will increase productivity of native grasses and cultivated crops by increasing soil moisture.
Bm1	neutral		very high	medium	mode-rate	moderate to high	high		
Cca	moderately alkaline	weakly calcareous, strongly alkaline							
Glimpse**								Moderate.	Moderate.
Ah	neutral		very high	medium		moderate to high		Maintain organic matter in Ah; prevent erosion of topsoil; ensure irrigation with nonsaline, noncalcareous water.	High K levels in Ah and Bm, may induce deficiencies of Ca andMg; irrgation will improve productivity of native grasses and cultivated crops.
Bm1	mildly alkaline		very high	medium	mode-rate		high		
Cca	moderately alkaline	moderately calcareous, strongly alkaline							
Gorge Creek								High.	High.
LH	extremely acid		low	low				Readily leached (already seriously impoverished); incorporate LH into Ae and Bm to preserve nutrients, increase organic matter content and moisture retention capability.	Avoid fire; encourage minor vegetation to assist improvement of soil fertility.
Bm	very strongly acid		medium	very low	very shallow	low	very low		
C	very strongly acid								
Godey								High.	High.
Ah	neutral		very high	medium				Readily leached; maintain organic matter in Ah for nutrition and moisture retention; majority of nutrition held in Ah.	Soil is subject to blow-outs; essential to maintain vegetative cover; soil has variable depth to IICk; textural change to IICca is from loamy sand to very gravelly coarse sand; there is a large decrease in CEC associated with the change in texture.
Bm	neutral		very high	medium	very shallow	moderate	moderate to low		
IICk	mildly alkaline	moderately alkaline	very high	low					
Godey**								High.	High.
Ah	neutral		very high	medium				Readily leached, however high Ca levels indicate free lime throughtout the soil; leaching by irrigation desirable; improve organic matter (Ah) by encouraging native bunchgrasses or cultivated crops; very shallow soil therefore avoid erosion and/or deep cultivation.	With the exception of theAh, K and Mg levels are depressed, a result of high Ca; total extractable P is low and is likely deficient especially with high Ca levels; suspect that Fe, B, Cu and Zn will also be deficient; organic carbon (Ah horizon) is low due to overgrazing at the site.
Bm	neutral		very high	medium/ low	very shallow	low	low		
Ck	mildly alkaline	weakly calcareous, moderately alkaline	very high	very low					

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – *** Alkalinity	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Godey**									
Ah	medium acid		very high	medium				High. Readily leached; maintain organic matter in Ah for nutrition and moisture retention; very shallow soil therefore avoid erosion and/or deep cultivation; irrigation must avoid excessive leaching.	High. Nutrition for this shallow soil appears balanched; productivity of irrigated crops will require fertilization to permit rapid cycling of nutrients.
Bm	neutral		very high	medium	very shallow	low	low		
Cca	mildly alkaline		very high	medium					
Ck	mildly alkaline	weakly calcareous, moderately alkaline	very high	medium					
Inkitsaph									
Ae	extremely acid		very low	low	mode-rate	low	low*	High. Easily leached (suited to acid-loving plants).	High. Incoporate LH into Ae horizon; no significant potential for enhancement.
Bm1	very strongly acid		very low	very low					
Inkoiko									
Ae	strongly acid		low	very low	deep	low	low*	High. Easily leached (suited to acid-loving plants).	High. Incorporate LH into Ae horizon; no significant potential for enhancement.
Bm1	strongly acid		low	very low					
BC	strongly acid								
Izman Creek**									
Ah	slightly acid		very high	low	mode-rate to deep		low	High. Readily leached; maintain organic matter in Ah for nutrition and moisture retention (native grasses); avoid fire.	Low to moderate. Moisture may be held up by Bmc1 and made available to plants over an extended period; soil is near capacity for nutrients but because of low CEC has little potential for improvement.
Ae	slightly acid		very high	low		moderate			
Bmc1	medium acid		very high	low					
C	medium acid								
Izman Creek**									
LFH	strongly acid							High. Readily leached; incorporate LFH into Ae for nutrition and organic matter; avoid fire and prevent erosion.	Low to moderate. Moisture and nutrients may be held up by the Bmc1 horizon; encourage minor vegetation (grasses especially) to help regrade the soil; some improvement is possible, though limited by low CEC.
Ae	medium acid		medium	low	deep	moderate	low		
Bmc1	medium acid		high	low					
C	mediun acid								
Kanaka									
Ah	medium acid		high	high/ medium		moderate	low	High. Shallow soil, readily leached; maintain organic matter in Ah horizon to preserve nutrients and hold moisture.	High. Shallow soil easily eroded when vegetation removed; maintain fertility by encouraging minor vegetation (mainly grasses); current fertility of Ah probably a temporary phenomenon pending return of forest succession.
Ae	strongly acid		low	medium	shallow				
Bm	strongly acid		low	low					
C	strongly acid								
Kerr									
Ah	slightly acid		very high	medium to high	very shallow	high	moderate	High. Although base saturation is high, pH levels suggest a high degree of leaching; limestone bedrock appears to weather readily; maintain organic matter & prevent erosion.	High. Short growing season; high (comparatively) precipitation; nutrient complex near capacity; high Ca: K & Mg: K ratio may induce K deficiency; P levels appear very low.
Bm1	very strongly acid		high						

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – *** Alkalinity	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Maiden								High. Very shallow soil (to Cca); maintain organic matter in Ae to aid nutrition and assist in holding seasonal moisture.	Moderate. High nutrition status of soil has limited effect on biomass production due to lack of soil moisture; leaching of Ca desirable; wide Ca:K and Mg:K ratio may encourage K deficiency.
LH	very strongly acid								
Ae	slightly acid		very high	medium/ high	very shallow	high	high		
Bm	slightly acid		very high	medium/ high					
Ck1	neutral	moderately alkaline	very high	medium					
McLaren								Moderate. Incorporate organic matter into Ae to preserve nutrition and retain soil moisture.	Moderate. Productivity limited by arid climate; encourage minor vegetation to maintain the inherently high level of fertility; prevent erosion.
LH	slightly acid								
Ae	medium acid		very high	medium					
Bt	slightly acid		very high	medium/ high	mode-rate	high	high		
Ck	neutral	mildly to strongly alkaline							
McKnight								High. Maintain organic matter in Ah for nutrition and moisture retention, vey shallow soil; prevent erosion.	Moderate. Maintain native grasses; careful irrigation (encourage leaching of Ca) will enhance productivity, high Ca in Bm and C horizons may limit availability of P, Fe and K; soil has significant potential for highly productive grassland and irrigated crops.
Ah	slightly acid		medium	medium					
Bm	neutral		very high	medium	very shallow	moderate	high		
IICsk	neutral	moderately alkaline, weakly saline	very high	medium					
Medicine								High. Maintain Ah by preserving organic matter and preventing erosion; soil depth varies and is susceptible to erosion.	High. Maintain Ah; leach excess Ca and K with irrigation; maintain native bunchgrasses; high Ca may induce deficiencies of P and Fe and possibly B, Cu and Zn; a highly productive soil with careful management.
Ah	slightly acid		very high	medium/ high	shallow to mode-rate	high	high		
BmK	neutral		very high	medium					
Cca	mildly alkaline		very high	medium					
Ck	mildly alkaline	mildly to strongly alkaline	vey high	medium					
Medicine**								High. Maintain organic matter in Ah horizon for nutrient and moisture retention; prevent erosion and exposure of subsoil; irrigation to leach free lime from Bm horizon.	High. High Ca levels may depress the availability of Mg and K; P and Fe, and perhaps B, Cu and Zn may also be deficient.
Ah1	neutral		very high	medium/ high					
Bmk1	neutral		very high	low/ medium	shallow	moderate	moderate*		
Cca	mildly alkaline	very weakly saline	very high	low/ medium	high to mode-rate				
Ck	mildly alkaline	weakly to moderately calcareous, weakly saline							

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – *** Alkalinity	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Medicine**								High.	High.
Ah	neutral		very high	medium/ high				Maintain organic matter in Ah for nutrient and moisture retention; irrigation to leach free lime from Bm horizon; soil extremely shallow; avoid exposure of calcareous subsoil.	maintain native grasses or organic residue to prevent erosion; high levels of Ca may depress the availability of Mg (and K); except for the Ah, P and Fe may be deficient along with B, Cu and Zn.
Bmk1	neutral		very high	medium	very shallow	moderate	moderate		
Cca	mildly alkaline	weakly calcareous	very high	medium					
Ck	mildly alkaline	mildly to strongly alkaline							
Minnie								Moderate.	Moderate.
Lh	extremely acid		high/very high	medium/ low	deep			Incorporate LH into Ae to maintain nutrition and moisture retention in rooting zone; Bt horizon will assist in holding seasonal moisture.	Encourage minor vegetation to aid soil regradation.
Ae	strongly acid		low			moderate to high	moderate to high		
Bt	slightly acid		very high	medium					
Ck	neutral	moderately alkaline							
Mossey**								Moderate.	Moderate.
Ah	slightly acid		very high	high				Maintain organic matter; protect soil depth from erosion and deep tillage.	A highly fertile and productive soil; maintain native grasses; nutrition near optimum balance; pH may retard availability of P.
Bm	neutral		very high	high	shallow	high	high to very high		
Cca	mildly alkaline	moderately alkaline	very high	high					
Mossey**								Moderate.	Moderate.
Ah	slightly acid		very high	medium/ high	mode-rate to shallow			Maintain organic matter; when irrigating ensure a degree of leaching with noncalcareous water to protect against a build-up of free lime; protect soil depth from erosion and deep cultivation.	High K levels may hinder uptake of Ca and possibly Mg; Mg appears to have been leached from Ah to Bm1.
Bm1	slightly acid		very high	medium/ high		high	high		
Cca	mildly alkaline	moderately alkaline	very high	medium					
Ck	mildly alkaline	moderately alkaline (moderately calcareous)							
Mossey**								Moderate.	Moderate.
Ah	slightly acid		very high	medium/ high				Maintain organic matter; when irrigating ensure a degree of leaching with noncalcareous water to protect against a build-up of free lime; protect soil depth from erosion and deep cultivation.	High K levels may hinder uptake of Ca and possibly Mg; Mg appears to have been leached from Ah to Bm1.
Bm1	neutral		very high	medium/ high	mode-rate to shallow	high	high		
Cca	mildly alkaline	moderately calcareous	very high	medium					
Ck	moderately alkaline	moderately alkaline, weakly calcarous							

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – *** Alkalinity	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Shumway									
Ah	neutral		very high	medium	mode-rate to shallow	high	high	Low-moderate. Maintain organic matter in Ah (with native grasses or careful cultivation practices); avoid compaction.	Moderate. Ensure adequate leaching with irrigation to prevent Ca build-up in upper horizons; avoid calcareous irrigation water.
Bm	neutral		very high	medium					
Ck2	mildly alkaline		very high	medium/ low					
Spius Creek									
Ae	slightly acid		vey high	medium	very deep	high	high	Low. Incorporate LH and/or H into Ae horizon to maintain nutrition and moisture retention; prevent erosion.	Low. Encourage minor vegetation to help regrade soil, especially Ae horizon; wide Ca:K and Mg:K ratios in Ae may induce deficiency of K.
Bt	slightly acid		vey high	medium/ high					
Ck2	mildly alkaline								
Timber									
Ae	slightly acid		high	medium	mode-rate	high	high	Low. Prevent erosion and exposure of calcareous C horizon.	Low. Incorporate LH into Ae horizon; nutrient storage near capacity; incresed production may be accomplished by increased cycling of nutrients.
Bm1	slightly acid								
Ck1	neutral								
Trachyte									
Ah	medium acid		very high	medium/ high				Moderate. High Ca and Na in Bm and C horizons indicate a sensitivity to alkalinity and salinity, therfore, prevent erosion or topsoil.	Moderate. Ah horison must be maintained by proper management of native grasses or careful cultivation – preserving organic matter, thickness, and moisture retention properties; irrigation should permit a moderate degree of leaching – at least until Ca and Na levels show a decline.
Bm	neutral		very high	medium	shallow to mod-erate	high	high		
Cca	mildly alkaline	moderately alkaline, weakly to moderately saline	very high	low/ medium					
Trachyte**									
Ah1	neutral		very high	medium/ high				Moderate. Maintain organic matter in Ah for nutrition and moisture retention; avoid erosion of topsoil.	Moderate. Maintain native bunchgrasses; high Na levels in Bnjt emphasizes sensitivity; soil reqiures leaching with non-calcareous, non-saline water for cultivated cropping; salinity may be due to capillary movement of moisture upward through the soil, then precipitation of salt.
Bnjt	neutral	weakly saline	very high	medium	mode-rate to shallow	high	high		
Cca	mildly alkaline	weakly to moderately calcareous	very high						
Ck	moderately alkaline	moderately calcareous, moderately alkaline							
Trachyte**									
Ah1	slightly acid		very high	medium				Moderate. Shallow soil; avoid erosion of topsoil; sample taken in mid-slope position; avoid saline, calcareous irrigation water.	Moderate. Maintain organic matter by careful management of native bunchgrasses; productivity will be enhanced with irrigation and increased cycling of nutrients.
Bm	neutral		very high	medium/ low	shallow	high	high		
Cca	mildly alkaline	moderately calcareous	very high	low					
Ck	moderately alkaline	moderately calcareous, moderately alkaline							

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – *** Alkalinity	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Tranquille Ah Bm Csk	 neutral neutral strongly alkaline	 weakly calcareous, very weakly saline	 very high very high	 medium medium	very shallow	high	high	High. Overgrazing will result in reduced organic matter in Ah, and may increase salinity, especially in areas of seepage.	High. Maintain organic matter in Ah; high Ca may induce deficiencies of P & Fe in all horizons; nutrient storage near capacity.
Trapp Lake Ah Bm Ck1	 slightly acid neutral neutral	 mildly alkaline, weakly saline	 very high very high very high	 medium medium low/very low	very shalow to shallow	moderate	moderate	High. Maintain organic matter in Ah for nutrition and moisture retention; most nutrients are held in the Ah & Bm; CEC drops in the C horizons; soil is very shallow; prevent surface erosion.	High. Nutrition is high in Ah and Bm; ensure that native grasses or cultivated land preserves Ah horizon; irrigation should ensure sufficient leaching to remove excessive Ca from Bm; high K levels in Ah may inhibit uptake of Ca and Mg; soil is very shallow; avoid deep cultivation.
Tullee** Ah Aeh Ae Bt1 Bt2	 medium acid medium acid slightly acid neutral mildly alkaline	 	 very high very high very high	 medium/ high medium medium	deep	high	high*	Moderate. Maintain organic matter; prevent erosion of topsoil.	Moderate. Prevent erosion; protect against build up of Ca (free lime) in the root zone; this is a deep, highly fertile soil; Ah horizon has high levels of K which may hinder Ca uptake.
Tullee** Ah Bm Cca Cks	 slightly acid neutral moderately alkaline moderately alkaline	 moderately calcareous weakly to moderately calcareous, weakly slaine	 very high very high very high	 medium medium low	very shallow	high	high to moderate	High. Easily eroded; maintain organic matter in Ah for nutrients and moisture retention; irrigation should avoid calcareous water.	High. High Ca levels in Ah & Bm may to depress Mg availablility; P and Fe may also be hindered by the Ca levels; grazing management must maintain native grasses and organic matter levels in the soil.
Tullee** Ah1 Ah3 Bm Cca Ck	 slightly acid slightly acid mildly alkaline moderately alkaline moderately alkaline	 weakly calcareous	 very high very high very high	 medium medium medium	mode-rate	high	high	Low. Maintain organic matter in Ah; avoid erosion or topsoil (thickness of Ah appears to have been partly a result of movement fro mupslope); avoid saline, calcareous irrigation water.	Low. Careful management of native bunchgrasses and/or irrigated crops will permit high productivity; K levels are somewhat high which may cause some antagonism with Ca and Mg; exchange complex is saturated, therefore incresed productivity may be obtained by increaed nutrients cycling by irrigation and fertilization.

Table 21 (cont'd). Estimated Fertility of Sampled Soil Associations In the Ashcroft Map Area

Soil Association and Designated Horizons	Reaction*** (pH)	Salinity – Alkalinity***	Base Saturation	Cation Exchange Capacity	Soil Depth	Subjective Rate of Weathering	Fertility Condition	Probability of Soil Degradation	Soil Response to Management Practices
Tullee**								Low to moderate. Maintain organic matter in Ah; avoid erosion of topsoil; avoid saline, calcareous irrigation water.	Moderate. Shallow soil; ensure good management of native bunchgrasses and/or irrigated crops; high Na indicates need for leaching when irrigating; sample site heavily grazed.
Ah	slightly acid		very high	medium	medium				
AB	slightly acid		very high	medium	medium				
Bm	neutral	moderately saline	very high	medium	shallow	high	high		
Cca	strongly alkaline	moderately calcareous	very high	low					
Ck	moderately alkaline	weakly saline, weakly calcareous							
Tunkwa								Low. Prevent leaching and erosion.	Low. Incorporate LH into Ae horizon; encourage minor vegetation to help regrade soil. Highly productive soil.
Ae	medium acid		high	medium	deep	high	high		
Bt	neutral		high	medium					

* seepage of water extends the normal period of available soil moisture to plants. It is also rich in nutrients and can significantly improve effects of the "fertility condition" by increasing the rate of cycling of nutrients. Seepage is indicated in the mapping units by the symbols for soil moisture regime (a, b, and c).

** refers to more than on profile of the same soil association sampled at different but closely related locations.

*** alkalinity rating in this column is based on soil reaction determined in a 1:1 soil/water solution. The interpretation in the Reaction (pH) column is based on pH determination in 0.01M CaCl2.

Additional Notes

1. The column "Subjective Rate of Weathering" refers to a qualitative estimate of the rate of release of nutrients from secondary soil minerals as a result of the "normal" weathering processes.

2. Use of fire as a mangement tool in Ashcroft map area is generally restricted from soils with steep topography and low fertility. Adequate precautions must be taken to protect the soil and biomass productivity.

3. Within the map area, biomass production usually increases with elevation (i.e. precipitation). Also, slope (length and degree) and aspect strongly affect biomass production. All these factors affect the rate of weathering of primary and secondary minerals, and the rate of cycling of nutrients in the soil.

4. With elevational changes in forest zone and the attendant change in moisture, and often topography, there is generally an increased sensitivity to eraosion and mass wasting; especially when mineral soil is exposed. The above table attempts to emphasize the importance of vegetation cover, especially minor vegetation, not only to prevent erosion but also for its ameliorative effects on the soil.

Table 22. Estimated Fertility of Non-Sampled Soil Associations within the Ashcroft Map Area.

Soil Association (non-sampled)	Fertility Condition (Estimated)	Comparable Soil Association (sampled)
Andrew	low	Abbott
Ashton	very low	Abbott
Blustery	moderate	Kerr
Bowman	moderate to high	Truda Mountain
Clapperton	very low	
Chataway	very low	
Frances	very high	Frisken
Gwenn	moderate to low	Glimpse (classification deviant)
Glossey	moderate	Dominic
Holden	low	Gisborne
Laluwissen	high	Lac du Bois
Meander	high	Trachyte
Mellin	moderate	
Soues	moderate	Commonage
Sciutto	moderate to low	Godey
Calling	low to very low	
Cochiwa	low to very low	
Curnow	low to very low	
Kha Lake	low	
Klowa Creek	very low	
Kumkan	very low	
Klept Lake	very low	
Kwoiek	very low	
Saatin	moderate	

Table No. 22 complements Table No. 21 by listing an estimated fertility condition for soils with similar characteristics to those which were sampled. Common factors are soil texture, landform and reaction.

5.3 Susceptibility of Soils to Erosion and Mass Movement in the Ashcroft Map Area

During the soil survey both soil erosion and mass movement were observed in the study area. Soil erosion refers to loss of soil due to features such as rills, gullies and the more subtle sheet erosion. Mass movement refers to large scale displacement of the soil mantle as associated with soil creep, debris avalanches, debris flows, rotational slumps, and earthflows.

1) Surface Soil Erosion

Active surface erosion such as soil creep, sheet, rill, and gully erosion occur in portions of the survey area. Map units containing these types of soil erosion are identified by soil component 8. These types of erosion usually occur through the combined effects of short duration, intensive rainfall on relatively long slopes with sparse vegetation cover. Other factors which influence surface erosion are surface soil structure (size of water stable aggregates), the amount of litter on the soil surface, and climatic factors such as duration and saturation of the soil mantle by melting snow pack.

2) Mass Movement

A summary of studies of major land slides within the study area are given in the Surficial Geology section in Chapter 1.7.2. Other mass movement, primarily debris avalanches and debris flows occur in the mountainous region bounded by the Thompson River on the east, the Fraser River on the west, the Marble Canyon - Pavilion Lake area in the north, and extending south to the boundary of the study area. The specific location of earthflows and rotational failures are not identified on the soils maps, but are indicated on the surficial geology maps referenced in Chapter 1.7.2.

Rock fall in talus areas has also been grouped with mass movement and these areas occur primarily in the mountainous areas west of the Fraser River. Active talus and snow avalanche areas are indicated on the soil maps by component 7 in soil associations derived from colluvium.

To evaluate surface erosion and mass movement potential, a number of soil and landscape parameters (and limits) were considered. The surface erosion potential interpretation assumes that all or most of the vegetative cover has been removed. It was not possible to fully consider rainfall intensity, frequency and duration and saturation of soil mantle by melting of the snow pack. These factors are extremely important, however, but difficult to measure and link to soil associations. Although these parameters were considered when rating each association, field observations and familiarity with each association were also employed.

If a soil association is rated as having a severe hazard for mass movement, there are some land management practices which can minimize the hazard.

Land managers can reduce mass movement potential by:

a) not saturating the deposit (through irrigation, septic field placement, drainage diversion)

b) not adding weight to the deposit (landfills)

c) not undercutting at the base of a potentially unstable deposit

d) diverting groundwater (drainage)

e) removing weight from the deposit

f) adding material to the base of the deposit.

Table 23 outlines how the soil parameters governing surface erosion and mass movement potential were rated (U.S.D.A 1971). Three classes of slope (in degrees) are rated for erosion potential for each group of soil associations and groups of soil association components (Table 24).

Table 23. Guide for Evaluating Surface Erosion and Mass Movement Potential of Mineral Soils

Soil Landscape Parameters	Degree of Hazard		
	Slight	Moderate	Severe
water stable aggregate diameter in mm >70% by weight (estimated)**	>3mm	.05-3mm	<0.5 mm
permeability/hour (surface & subsurface estimated)**	rapid to very rapid >6.0 mm	moderate to moderately rapid 0.6 - 6.0 mm	very slow to moderately slow <0.6 mm
slope (non-vegetated)** (vegetated)** seepage*	0 - 5% <16% none	5 - 15% 16 - 45% brief periods of intermittent saturation	>15% 45 - 70+% extended periods of seepage and saturation
depth to bedrock or impervious layer*	>5 m	1 - 5 m	<1 m
origin of parent material (and bedrock type)*	gravelly textured fluvial materials	–	silt textured lacustrine
drainage*	rapidly to well drained	moderately well to imperfectly drained	poorly to very poorly drained
forest floor & grassland litter (thickness)	limits not established — interpretation based on observation		
Unified soil texture group*	GW, GP, SW, SP	GM, GC, SC, CH, OH	SM, CL, OL, MH, ML

* These parameters were primarily considered for mass movement.

** These parameters were primarily considered for surface erosion.

Table 24. Erosion and Some Hydrologic Interpretations of Ashcroft Map Area Soil Associations

Soil Association and Components	Slope (°)	Mass Movement			Surface Erosion			Erosion Related Characteristics	
		Slump/ Earthflow	Debris Avalanche/ Flow	Rock Fall (Talus)	Sheet/ Rill Erosion	Gulley Erosion	Sediment Yield	Land	Stream
Abbott Andrew Ashton Aylmer leather Tisdall Tole	0-5 5-15 >15	slight/nil slight/nil slight/nil	slight/nil slight/nil slight/nil	slight/nil slight/nil slight/nil	moderate moderate severe	slight moderate severe	slight slight moderate	Coarse texture results in a lack of cohesion between soil particles; rapid drainage permits most excess moisture to percolate through the profile. Organic matter of grass and forest litter will help retard erosion.	Alteration of stream courses (naturally or man-made) will cause severe erosion; sediment yield is slight but variable due to variable particle size distribution in the parent materials. Silt and clay fraction is low or absent. Normal erosion products include sand, stones, cobbles (some boulders), and organic material.
Blustery Cairn Mountain Calling Carson Cavanaugh Chasm Clemson Crown Mountain Curnow Hallamore Helmcken Hemp Hooligan Hotfish Placid Soues	0-5 5-15 >15	slight/nil slight/nil slight	moderate moderate severe	slight slight slight	moderate moderate severe	slight moderate severe	slight/ moderate slight/ moderate moderate	Coarse texture results in a lack of cohesion between soil particles (not as great with the colluvial group derived from granite); generally rapid drainage permits most excess moisture to percolate through the profile. Addition of moisture in seepage areas increases the risk of erosion when vegetation is removed. Organic matter in the "litter" horizon helps protect the soils. Soil depths >1 m.	Alteration of stream courses (naturally or man-made) will cause severe erosion; sediment yield is slight to moderate due to relatively low amounts of silt and/or clay. Erosion products include sand, stones, some cobbles and boulders, and organic material.
Calling (CL4) Curnow (CX4)			severe — snow & debris avalnche						
Cedarbench Chataway Clapperton Cochiwa Conant	0-5 5-15 >15	slight/nil slight/nil slight	moderate moderate severe	slight slight slight	moderate moderate/ severe severe	slight slight/ moderate severe	slight slight slight/ moderate	Very coarse texture results in a lack of cohesion between soil particles (greater than previous group derived from volcanic and limestone bedrock); rapid drainage permits most excess moisture to percolate through the soil profile. Addition of moisture in seepage increases the risk of erosion when vegetation is removed. Organic matter in the "litter" horizon and minor vegetation helps protect the soils.	Alteration of stream courses (naturally or man-made) will cause severe erosion; sediment yield is slight due to absence of silt and/or clay. Erosion products include sand, stones, cobbles and boulders, and organic material.
Cedarbench (CZ4) Cochiwa (CV4)			severe — snow & debris avalanche						
Cache Creek Carabine Courtney Commonage	0-5 5-15 >15	nil nil nil	slight/nil slight/nil slight/nil	nil nil nil	moderate severe severe	slight/ moderate severe severe	moderate moderate moderate/ severe	Medium to coarse textures are due mainly to high sand (and gravel) contents. Cohesion is poor. Soils are well drained and seepage is generally absent. Soils are sensitive to mistreatment and impact of erosion is great. Organic matter in Ah helps protect the soils.	Alteration of stream courses (naturally or man-made) will cause severe erosion; sediment yield is generally moderate due to the silt fraction that is usually present. Other erosion products include sand, stones and some cobbles, and organic material.

Table 24 (cont'd). Erosion and Some Hydrologic Interpretations of Ashcroft Map Area Soil Associations

Soil Association and Components	Slope (%)	Mass Movement			Surface Erosion			Erosion Related Characteristics	
		Slump/ Earthflow	Debris Avalanche/ Flow	Rock Fall (Talus)	Sheet/ Rill Erosion	Gulley Erosion	Sediment Yield	Land	Stream
Component 7 of: Calling Cavanaugh Cedarbench Chasm Clapperton Cochiwa Conant Crown Mountain Curnow	>15	slight/nil	slight/nil	severe	severe	severe	slight/ moderate	Talus is an active mass wasting process in these soil association components; slopes vary in their degree of instability.	Alteration of stream courses resulting in the undercutting of slopes will increase their instability. Sedi- ment yield of silt and clay is very low or nil; erosion products include sand, cobbles, stones and boulders and limited amounts of organic material.
Component 5 & 6 of: Blustery Calling Carabine Cavanaugh Chasm Chataway Clemson Conant Cochiwa Crown Mountain Curnow Hallamore Helmcken Hemp Hotfish Hooligan Kerr Placid	0-5 5-15 >15	slight/nil slight/nil slight/nil	slight/nil slight/nil severe	moderate moderate severe	moderate severe severe	moderate severe severe	slight slight slight/ moderate	Coarse textured soil is often developed "in situ" thus reflecting the weathering properties and stability of the parent rock. Moisture readily saturates the very shallow soil profile causing localized instability and high sensitivity to bedrock controlled gulley erosion, and increased fracturing with freeze-thaw, hot-cold cycles, etc. Soil depths <50 cm.	Bedrock controlled stream courses will tend to divert stream energy toward adjacent unconsolidated material; some rock types are readily eroded yielding specific size fractions of the genetic rock-type. Generally, sediment yeild of silt and clay is low; erosion products include sand, stones, cobbles, boulders and organic material.
Calling Cedarbench Cochiwa Curnow	>30							Severe soil churning by vegetation uprooting.	
Kanaka Kha Lake Klept Lake Klowa Creek Kumkan Kwoiek	0-5 5-15 >15	slight/nil slight/nil slight/nil	slight/nil slight/nil severe	moderate moderate severe	moderate severe severe	moderate severe severe	slight slight slight/ moderate	Coarse textured soil is often developed "in situ" reflecting the weathering properties and stability of the parent rock. Moisture readily saturates the very shallow soil profile causing localized instability and high sensitivity to bedrock controlled gulley erosion, and increased fracturing with freeze-thaw, hot-cold cycles, etc. Soil depths range from Lithic (<50 cm) to <1 m to bedrock.	Bedrock controlled stream courses will tend to divert stream energy toward adjacent unconsolidated materials; some rock types are readily eroded yielding specific size fractions of the genetic rock- type. Generally, sedi- ment yield of silt and clay is low; erosion poducts include sand, stones, cobbles, boulders and organic material.
Bester Dominic Frances Frisken Scuitto Shumway	0-5 5-15 >15	slight/nil slight/nil slight/nil	slight slight moderate	nil nil nil	slight/ moderate moderate/ severe severe	slight moderate severe	slight moderate severe	Medium textured soils that have low cohesion. Soils are not normally associated with steep slopes; deflation (blow-out) can occur when vegetation is removed.	Soils are usually adjacent to streams. Stream bank vegetation must be maintained to prevent erosion and production of fine sand and silt-sized particles. Avoid compaction of streambanks by machinery or livestock and avoid alterations to stream channels.

Table 24 (cont'd). Erosion and Some Hydrologic Interpretations of Ashcroft Map Area Soil Associations (Cont'd)

Soil Association and Components	Slope (%)	Mass Movement			Surface Erosion			Erosion Related Characteristics	
		Slump/ Earthflow	Debris Avalanche/ Flow	Rock Fall (Talus)	Sheet/ Rill Erosion	Gulley Erosion	Sediment Yield	Land	Stream
Beaver Flat Creek Fleet Creek	0-5 5-15 >15	nil nil nil	nil nil nil	nil nil nil	moderate severe severe	slight moderate severe	slight slight slight/ moderate	Coarse-textured soils which all normally rapidly or well drained, therefore most moisture will percolate through soil; however, lack of cohesion between particles makes these soils very sensitive to erosion.	Alteration of stream courses (natural or man-made) will result in severe erosion; sediment yield of fine sand and silt is slight to moderate.
Godey Glimpse Gwenn	0-5 5-15 >15	nil nil nil	nil nil nil	nil nil nil	slight moderate severe	slight moderate severe	slight slight slight	Coarse-textured soils, well drained, lack cohesion between soil particles; percolation rate is high. Organic matter incorporated into surface horizons will retard erosion.	Alteration of stream courses (natural or man-made) will result in only slight sedimentation due to lack of silt; erosion will yield sand, cobbles, stones and bouldersd and organic matter.
Boxer Dunleavy Glimpse Glossey Gorge Creek Holden Inkitsaph Inkoiko Izman Creek Laurel Rennie Stolle Struthers Succour Terman	0-5 5-15 >15	nil nil nil	nil nil nil	nil nil nil	slight moderate severe	slight moderate severe	slight slight slight	Coarse textured soils lack cohesion between soil particles; rapid drainage removes most excess moisture; however, minor vegetation will help retard erosion.	Alteration of stream courses (natural or man-made) will result in slight sedimentation due to lack of silt; however, erosion of sand, cobbles, stones, boulders, and organic matter will be severe.
Alkali Allamore Artisan Beaverhut Bowman Eugene Maiden McLaren Mellin Minnie Saatin Spius Timber Truda Mountain Tsintsunko Tunkwa	0-5 5-15 >15	nil nil moderate	nil slight moderate	nil nil nil	slight moderate severe	slight moderate severe	slight moderate severe	Soils moderately cohesive although exposure of mineral soil will result in erosion. Erosion more severe with increasing elevation; flows on steep slopes may occur where the solum becomes saturated and slips on impermeable parent material. Minor vegetation will retard erosion. Presence of seepage will enhance slumping and erosion processes.	Alteration of stream courses (natural or man-made) will result in severe erosion (and/or slumping of cut banks) and sedimentation yielding silt, some clay, sand, cobbles, stones and organic matter.
Rail Rayonier Oregon Jack	0-5	nil	nil	nil	nil	nil	severe	Organic soils usually occur in depressional areas.	Severe rating associated with stream cutting and erosion of organic material.

Table 24 (cont'd). Erosion and Some Hydrologic Interpretations of Ashcroft Map Area Soil Associations (Cont'd)

Soil Association and Components	Slope (°)	Mass Movement			Surface Erosion			Erosion Related Characteristics	
		Slump/ Earthflow	Debris Avalanche/ Flow	Rock Fall (Talus)	Sheet/ Rill Erosion	Gulley Erosion	Sediment Yield	Land	Stream
Lac du Bois Laluwissen Lundbom	0-5 5-15 >15	slight moderate severe	moderate moderate severe	nil nil nil	moderate severe severe	moderate severe severe	moderate severe severe	Soils have high silt that is highly erodable, subject to slumping and piping. Excess moisture has tendency to overland flow. Maintain organic matter and prevent deep saturation. Seepage will enhance slumping and piping processes.	Alteration of stream courses (natural or man-made) will result in severe erosion (and/or slumping of cutbanks) and sedimentation. Erosion products include fine sands and silts and organic matter.
McKnight McQueen Meander Medicine Mossey Trachyte Tranquille Trapp Lake Tullee	0-5 5-1 >15	nil nil slight	nil slight moderate	nil nil mil	slight moderate severe	slight moderate severe	slight moderate severe	Soils moderately cohesive although exposure of mineral soil (removal of vegetation) will result in erosion. Flows on steep slopes may occur where the solum becomes saturated and slips on impermeable parent material.	Alteration of stream courses (natural or man-made) will result in severe erosion and sedimentation yielding silt, some clay, sand, cobbles, stones (minor) and organic matter.

5.4 Engineering Properties of Soil

The criteria used in Table 25 are derived from the United States Department of Agriculture, 1971 publication *Guide for Interpreting Engineering Uses of Soils*.

5.4.1 Estimated Soil Properties Significant to Engineering

Table 25 contains some estimated soil properties significant to engineering uses as well as some interpretations based on point samples of some soil associations. The level of sampling is not sufficient to provide a full range of soil properties and variability within each soil association. Plastic and liquid limits determined by laboratory analysis are given for some soil associations. Percent passing <2 mm sieves is estimated from hand textures with percentages determined from the textural triangle (CSSC, 1978).

It should be noted that textural variations listed in the Soil Legend indicate the pedogenic texture first, followed by the parent material texture. Often the latter texture class is coarser than the former due to a variable thickness of eolian (wind blown) silty or sandy material which covers most the landscape. Soils of the Luvisolic order are an exception and surface textures are often coarser than the parent material textures.

Table 25. Estimated Soil Properties Significant to Engineering

Soil Association and Component	Depth To:		Depth From Surface (cm)	Classification	% Coarse Fraction >3 in.	% <3 in Passing Sieve				Liquid Limit	Plastic Limit	Permeability[1]	Available Water Storage Capacity	Reaction	Salinity	Shrink-Swell Potential[2]
	Bedrock	Seasonal High Water		Unified (texture)		No. 4 47 mm	No. 10 2.0 mm	No. 40 0.42 mm	No. 200 0.074 mm							
Abbott	>1 m	>1 m	43	SM, SP, GW,SP-SM	<10*	60*	40*	10-20*	—	-	-	rapid	-	medium acid	N/A	very low
Andrew	>1 m	>1 m	40*	SM, SC, SM-SC, GW	<10*	70*	50*	20-30*	<5*	-	-	rapid*	-	neutral*	N/A	very low
Ashton	>1 m	>1 m	40*	SM, SP, GW, SP-SM	<10*	70*	50*	20-30*	<5*	-	-	rapid*	-	neutral*	N/A	very low
Aylmer	>1 m	>1 m	41	SM, SC, SM-SC, ML,GW	<10*	75*	50*	20-30*	<5*	-	-	rapid	-	mildly alkaline	N/A	very low
Blustery	>1 m	>1 m	40*	ML ,CL, ML-CL	<5*	70*	50*	20-30*	50-10*	-	-	moderately rapid*	-	slightly acid to neutral	N/A	low
Bowman BW5,6	>1 m <50 cm	>1 m	100 <50	ML-CL, CL, CH, MH	<2*	75*	60*	40-60*	20-30*	-	-	moderate*	-	moderately calcareous	N/A	moderate
Cache Creek	>1 m	>1 m	28	SM, SC, SM-SC	<2*	70*	60*	20-30*	5-10*	-	-	rapid	-	mildly alkaline	weakly saline	low
Carabine CB5	>1 m <50 cm	>1 m	30 <50	SM, SC, SM-SC, ML-CL, ML, CL	<1 *	75*	65*	50-65*	50-60*	-	-	moderately rapid	-	moderately alkaline	N/A	low
Cavanaugh CG5,6	>1m <50	>1 m	62 < 50	SM, ML, SP-SM, SP	2*	45	27	-	-	21.6	16.2	rapid	-	mildly alkaline, weakly calcareous	N/A	very low
Conant CA5,6	>1 m <50 cm	>1 m	135 <50	SM, SP, GW, SP-SM	<5*	75*	60*	20-30*	5	-	-	very rapid	-	neutral - mildly alkaline	N/A	very low
Chasm CH5,6	>1 m <50 cm	>1 m	59 <50	SP-SM, SM, SP	2*	60*	50*	20-30*	<5	-	-	moderately rapid	-	neutral	N/A	very low
Crown Mtn. CN5,6	>1 m <50 cm	>1 m	12 <50	SM, SC, SM-SC	<10*	60*	50*	20-30	<5	-	-	moderately rapid	-	mildly alkaline	N/A	very low
Cairn Mtn. CR5,6	>1 m	>1 m	100 * <50	SM, SC, SM-SC, ML-CL, CL, ML	<5	60*	50*	20-30	<5	-	-					
Calling	>1 m	>1 m	<100* 80	SM, SC, SM,-SC, GC	<20*	<50*	<40*	5-15*	-	-	-	rapid**	-	neutral to acid	N/A	very low
Carson CS5,6	>1 m <50 cm	>1 m	55 <50	SM, SM-SC, ML, SC	<5*	75*	60*	40-50*	<5	-	-					

Table 25 (cont'd). Estimated Soil Properties Significant to Engineering

Soil Association and Component	Depth To:		Depth From Surface (cm)	Classification	% Coarse Fraction >3 in.	% <3 in Passing Sieve				Liquid Limit	Plastic Limit	Permeability[1]	Available Water Storage Capacity	Reaction	Salinity	Shrink-Swell Potential[2]
	Bedrock	Seasonal High Water		Unified (texture)		No. 4 47 mm	No. 10 2.0 mm	No. 40 0.42 mm	No. 200 0.074 mm							
Cedarbench	>1 m	>1 m*	114	SP-SM, SP, GM, GC	<20*	<40*	<30*	5-15*	-	-	-	rapid	-	very strongly acid	N/A	very low
Chataway CY5,6	>1 m <50 cm	>1 m	<50 * <50	SM, SP, GW, SP-SM	<5	60*	60*	20-30*	<5	-	-					
Clapperton CP5,6	>1 m <50 cm	>1 m	100 * <50	SM, SP, GW, SP-SM	<5	60*	50*	20-30	<5	-	-					
Clemson CW5,6	>1 m <50 cm	>1 m	34 <50	SP-SM, SM, SP, SM-SC, ML	<5	70*	60*	40-50*	5-10*	-	-					
Cochiwa	>1 m	>1 m	<100 *	SP-SM, SM, SP, GM, GC	<20*	<40*	<30*	5-15*	-	-	-	very rapid*	-	strongly acid	N/A	very low
Commonage	>1 m	>1 m	74	SM, SP-SM, SP	<10	60*	50*	20-30	15-30*	-	-					
Courtney	>1 m	>1 m	30	SM, SC, SM-SC, ML-CL, CL, ML	-	-	-	78	57	92.6	2.2					
Curnow	>1 m	>1 m	58	SM, SC, SM-SC, GC	<20*	<50*	<40*	5-15*	-	-	-	rapid	-	neutral	N/A	very low
Dominic	>1 m	>1 m	46	SM, ML, ML-CL, SM-SC, CL	N/A	100*	100*	90-100*	70-90*	-	-					
Flat Creek	>1 m	>1 m	58	SP-SM, SM, SP, SC, SM-SC	N/A	100*	100*	65-80*	20-35*	-	-	rapid	-	mildly alkaline	N/A	very low
Fleet Creek	>1 m	>1 m	25	SP-SM, SM, SP	N/A	100*	100*	65-80*	10-20*	-	-	rapid	-	slightly acid	N/A	very low
Frances	>1 m	30-100 cm	30 *	SM, SC, SM-SC, ML-CL, ML, CL	N/A	100*	100*	85-95*	50*65*	-	-	moderate*	-	moderate alkaline	N/A	low - very low
Frisken	>1 m	<30 cm	30	SM, SC, SM-SC, ML-CL, ML, CL	N/A	100*	100*	85-95*	50-65*	-	-	very rapid	-	neutral - mildly alkaline	N/A	very low
Gisborne	>1 m	>1 m	43	SM, SP-SM, SP, GW, GM, GC	<5*	75*	60*	20-30*	<10*	-	-	moderate	-	mildly to moderately alkaline	weakly saline	low
Glimpse	>2m	>2 m	30	SP-SM, SM, SP, GM, GC	<10*	-	-	78	-	92.6	2.2	rapid	-	mildly alkaline	N/A	very low

Table 25 (cont'd). Estimated Soil Properties Significant to Engineering

Soil Association and Component	Depth To: Bedrock	Depth To: Seasonal High Water	Depth From Surface (cm)	Classification Unified (texture)	% Coarse Fraction >3 in.	% <3 in Passing Sieve No. 4 47 mm	No. 10 2.0 mm	No. 40 0.42 mm	No. 200 0.074 mm	Liquid Limit	Plastic Limit	Permeability[1]	Available Water Storage Capacity	Reaction	Salinity	Shrink-Swell Potential[2]
Glossey	>1 m	>1 m	30	SM, SC, SM-SC, ML-CL, SP-SM, SP, GM, GC	<10*	70*	60*	40-50*	<10*	-	-	rapid*	-	neutral to basic	N/A	low-very low
Godey	>1 m	>1 m	26	SM, SC, SM-SC, ML, SP-SM, SP, SC, GM, GC, GP, GW	<10*	60*	50*	20-30*	<5	-	-	rapid	-	mildly alkaline, weakly calcareous	N/A	very low
Gorge Creek	>1 m	>1 m	25	SP, GW, SP-SM, SM, GM, GC	<10*	60*	50*	20-30*	<5*	-	-	very rapid	-	very strongly acid	N/A	very low
Gwenn	>2 m	>2 m	<50	SM, SM-SC,. ML, CL, ML-CL/SP, SM, SM-SP, SC, GM, GC	<10*	70*	50*	20-30*	<10*	-	-	rapid*	-	medium acid	N/A	low-very low
Holden	>1 m	>1 m	<50*	SM, SC, SM-SC, ML-CL, ML, CL/SP-SM, SM, SP, SM-SC, GM, GC	<5*	70*	60*	40-50*	<10*	-	-	rapid*	-	neutral	N/A	low-very low
Inkoiko	>1 m	>1 m	112	SP-SM, SM, SP, GM, GC	<20*	<40*	<30*	5-15*	-	-	-	rapid	-	strongly acid	N/A	
Inkitsaph	>1 m	>1 m	72	SP-SM, SM, SP, GM, GC	<20*	<40*	<30*	5-15*	-	-	-	rapid	-	strongly acid	N/A	very low
Izman Creek	>2 m	>2 m	224	ML-CL, CL, ML/SP, GW, SP-SM, SM	<10*	<50*	<40*	5-15*	-	-	-	moderate to moderately rapid	Ac 11.1 Bm 10.0 Ck 9.6	medium acid	N/A	very low
Kha Lake, Kanaka, Klowa Creek, Kumkan, Klept Lake, Kwoick	<1 m <1 m <1 m <1 m <1 m <1 m	N/A N/A N/A N/A N/A N/A	<60* 61 <60* <60* <60* <60*	GM, GC, SP, GW, SP-SM, SM, ML-CL, ML, CL	<10*	-	-	-	-	-	-	rapid	-	strongly acid	N/A	low very low to low
Kerr	<25 cm	N/A	25	SM, SC, SM-SC, ML-CL	<5*	80*	80*	60-70*	30-40*	-	-	moderate to rapid	-	strongly acid	N/A	
Lac du Bois	>1 m	>1 m	50	CL-ML, CL, CH, MH	N/A	100*	100*	95-100*	85-95*	-	-	moderately slow	Ap 24.6 Btnjk 25.1 Ck 21.6	moderately alkaline, weakly calcareous	weakly saline	low to very low moderate

Table 25 (cont'd). Estimated Soil Properties Significant to Engineering

Soil Association and Component	Depth To: Bedrock	Depth To: Seasonal High Water	Depth From Surface (cm)	Classification Unified (texture)	% Coarse Fraction >3 in.	% <3 in Passing Sieve No. 4 47 mm	No. 10 2.0 mm	No. 40 0.42 mm	No. 200 0.074 mm	Liquid Limit	Plastic Limit	Permeability[1]	Available Water Storage Capacity	Reaction	Salinity	Shrink-Swell Potential[2]
Laluwissen				ML-CL, ML, CL, CH, MH	N/A	100*	100*	95-100*	85-95*	-	-	moderately slow*	-	moderately to strongly alkaline	N/A	moderate
Lundbom	>2 m	>2 m	180	CL-ML, CL, CH, MH	N/A	-	-	97.93	97	-	-	moderately slow	-	mildly alkaline, weakly calcareous	N/A	moderate
Maiden MD5,6	>1 m <50 cm	>1 m	23	ML-CL, ML, CL, CH, MH	<2*	80*	80*	60-80*	40-60*	-	-	moderate	-	neutral	N/A	low
McKnight MG5,6	>1 m <50 cm	>1 m	28	ML-CL, CL, ML	<6*	75*	75*	65-75*	50-65*	-	-	moderately rapid	similar to Tranquille	neutral	mode-rately saline	low
McLaren ML5,6	>1 m <50 cm	>1 m	63	ML-CL, ML, CL	<2*	74	56	12.71	9	-	-	moderate	-	neutral	N/A	low
Meander MA5,6	>1 m <50 cm	>1 m	<50 <50	ML-CL, ML, CL, CH, MH	<2	80*	80*	60-80*	40-60*	-	-	moderate to moderately rapid*	-	moderate to strongly calcareous	weakly saline*	low
McQueen MQ5,6	>1 m <50 cm	>1 m	30	ML-CL, CL, ML, SM, SC, SM-SC	<2*	80*	80*	60-80*	40-60*	-	-	moderately rapid	-	moderately alkaline, weakly calcareous	N/A	moderate
Medicine MC5,6	>1 m <50 cm	>1 m	57	ML-CL, CL, ML, SM, SC, SM-SC	<2*	80*	80*	60-80*	40-60*	-	-	moderate to moderately rapid	Ah1 22.0 Bmk 14.7 CKs 15.1	mildly alkaline, weakly to moderately calcareous	weakly saline	low
Mellin	>1 m	>1 m	<50*	ML-CL, CL, ML	<6*	55-65*	50-60*	20-30*	-	-	-	moderately rapid*	-	neutral	N/A	low
Minnie MN5,6	>1 m <50 cm	>1 m	37	ML-CL, CL, ML	6*	58	53	20.57	-	29.8	18.7 PI = 11.1**	moderate	-	neutral	N/A	low
Mossey MS5,6	>1 m <50 cm	>1 m	24	ML-CL, CL, ML	<2*	80*	80*	65-75*	50-60*	-	-	moderate to moderately slow	Ah 18.9 Bm 18.7 Ck 15.6	moderately alkaline	N/A	low
Scuitto	>1 m	>1 m	<30*	SM, SC, SM-SC, ML-CL, ML, CL	N/A	100*	100*	85-95*	60-75*	-	-	moderately rapid	-	mildly alkaline	-	low to very low

Table 25 (cont'd). Estimated Soil Properties Significant to Engineering

Soil Association and Component	Depth To: Bedrock	Depth To: Seasonal High Water	Depth From Surface (cm)	Classification Unified (texture)	% Coarse Fraction >3 in.	% <3 in Passing Sieve No. 4 47 mm	No. 10 2.0 mm	No. 40 0.42 mm	No. 200 0.074 mm	Liquid Limit	Plastic Limit	Permeability[1]	Available Water Storage Capacity	Reaction	Salinity	Shrink-Swell Potential[2]
Shumway	>1 m	>1 m	58	SM, SC, SM-SC, ML, CL, ML-CL	N/A	100*	100*	60-70*	30-40*	-	-	moderately rapid	-	mildly alkaline	N/A	low
Soues	>1 m	>1 m	<60	SM, SC, SM-SC, ML	<5*	65*	65*	20-45*	<5*	-	-	rapid*	-	moderately alkaline	N/A	low to very low
Spius Creek SP5,6	>1 m <50 cm	>1 m	73 <50	ML-CL, ML, CL	<5*	89	78	22	17	37	22.4 PI = 15**	moderately rapid	-	mildly alkaline	N/A	low
Timber TH5,6	>1 m <50 cm	>1 m	46	ML-CL, ML, CL, CH, MH	<2*	80*	80*	65-80*	50-65*	-	-	moderately rapid	-	mildly - moderately alkaline		moderate
Trachyte TH5,6	>1 m <50 cm	>1 m	49	ML-CL, ML, CL, CH, MH	<2*	80*	80*	60-80*	40-60*	-	-	moderately rapid to moderate	Ah1 35.9 Ah2 20.6 Bm 15.3 Ck 12.4	moderately alkaline, moderately calcareous	weakly saline	moderate
Tranquille TQ5,6	>1 m <50 cm	>1 m	30	ML-CL, ML, CL, CH, MH	<5*	<60*	<60*	45-60*	25-45*	-	-	moderate	Ah 14.8 Bm 20.3 Ck 15.8	strongly alkaline, moderately calcareous	weakly saline	moderate
Trapp Lake TP5,6	>1 m <50 cm	>1 m	<30*	ML-CL, ML, CL, CH, MH	<2*	80*	80*	60-80*	40-60*	-	-	moderately rapid	-	mildly alkaline	weakly saline*	moderate
Truda Mtn. TU5,6	>1 m <50 cm	>1 m	112 <50	ML-CL, ML, CL	<5*	50*	40*	10-20*	5-15*	-	-	moderate	-	neutral to mildly alkaline	N/A	low
Tulloe TE5,6	>1 m <50 cm	>1 m	30	ML-CL, ML, CL, CH, MH	<2*	80*	80*	60-80*	40-60*	-	-	moderately slow to moderate	similar to Trachyte	moderately alkaline, moderately calcareous	weakly saline	moderate
Tunkwa TW5,6	>1 m <50 cm	>1 m	81 <50	ML-CL, ML, CL	6	50	36	12	9	23.4	17.9 PI = 5.5**	moderatele rapid	-	neutral	N/A	low

* N.B. These specific properties are estimates based on fliedd observation.

** PI = Plasticity Index

1. Permeability: The permeability estimate refers to the soil solum overlying unweathered or unaltered parent material. Lacustrine and till soil parent materials are usually compact and are less permeable thanthe upper soil.

2. Shrink-Swell Potential: This column is derived from soil texture and/or the Unified soil groupings. More specifically it is and estimate of the presence (absence) of expanding clay minerals.

5.5 Selected Interpretations of Soils Based on Engineering Properties

Table 26 provides a number of interpretations for engineering use of soils including the degree and kind of limitations for: septic tank absorption fields, sewage lagoons, shallow excavations, sanitary landfill, and local roads and streets.

Soil associations are also rated for suitability as a source of road fill, sand and gravel, topsoil, pond reservoir areas, drainage for crops and pasture, irrigation, and potential frost action.

Soils (materials) were grouped according to similar textural properties, and depth to bedrock.

It should be noted that Table 26 is intended for generally locating areas in the Ashcroft map area which warrant further detailed study. This table is not meant as a substitute to on site inspection for proposed projects.

The procedure for developing the interpretations is described in detail in *Guide for Interpreting Engineering Uses of Soils*, U.S.D.A., Soil Conservation Service, 1971. A more recent publication, Maynard (1979), is recommended for persons interested in urban suitability of various types of materials. A simplified description of the various interpretations and factors considered follows.

(a) **Septic Tank Absorption Fields**

The criteria used for rating soils as slight, moderate, or severe for use as absorption fields are based on the ability of the soil to absorb effluent. The parameters considered include: permeability class, hydraulic conductivity, percolation rate, depth to water table, flooding, slope, depth to bedrock, stoniness, and rockiness.

Contamination hazard may exist if water supplies, streams, ponds, lakes or water courses are nearby and receive seepage from the absorption field. This is particularly important in areas of coarse-textured soils, active seepage zones and locations where silty (lacustrine) soils subject to piping occur.

(b) **Sewage Lagoons**

Soil suitability for sewage lagoons is determined by considering the suitability of the material for both the floor of the lagoon and the enclosing embankment.

Soil requirements for floors of lagoons are: (1) slow rate of seepage; (2) even surface of low gradient and low relief; and (3) little or no organic matter. The presence of organic matter in the surface soil horizon was not considered as a limitation since this horizon is usually removed during construction, and perhaps, used as topsoil.

(c) **Shallow Excavation**

Shallow excavations are trenches or other excavations up to 2 metres in depth. Items affecting use include: soil drainage class, depths to seasonal high water table, flooding, slope, texture of soil, depth to bedrock, and stoniness and rockiness classes.

(d) **Sanitary Landfill**

The landfills can be area-type or trench-type; the interpretations given in Table 26 have general application to both types. It should be noted that this interpretation is

intended for generally locating suitable sites within the map area which warrant further detailed study, particularly with respect to the depth of suitable material.

Soil suitability for sanitary landfills is determined by considering the following parameters: depth to seasonal high watertable, soil drainage class, flooding, permeability, slope, soil texture, depth to bedrock, and stoniness and rockiness classes.

(e) **Local Roads and Streets**

These suitability ratings consider the use of soils (materials) for construction of local roads and streets that have all-weather surfacing.

Soil parameters used to determine the suitability include: soil drainage class, flooding, slope, depth to bedrock, Unified texture group, shrink-swell potential, susceptibility to frost action, and stoniness and rockiness classes.

(f) **Road Fill**

The ratings of good, fair and poor reflect how well a soil performs after it is removed from its original location and is placed in a road embankment elsewhere. The rating is given to the whole soil, from the surface to a depth of up to 2 metres, based on the assumption that soil horizons will be mixed in loading, dumping and spreading.

Parameters used to determine soil (material) suitability include: Unified texture group, shrink-swell potential, susceptibility to frost action, slope, stoniness and rockiness classes, and soil drainage class. Soils which have less than 1 m depth of material which is considered good for road fill have been given a rating of **poor**, due to lack of volume caused by the proximity of the underlying bedrock.

(g) **Sand (and Gravel) Sources**

The ratings provide a guide for locating probable sources of sand or gravel in sufficient quantities for excavation and use. It does not provide an assessment of the quality of the aggregate.

Suitability ratings of soils as sources of sand and gravel are based on the Unified texture groups. Groupings of soil associations in Table 26 (Column 1) is based on landform, therefore generally ensuring an adequate deposit of material.

(h) **Topsoil**

Topsoil is generally applied to cover barren surfaces so that vegetation can be established. A soil rated as a good source of topsoil has physical, chemical, and biological characteristics favourable for establishment and growth of adapted plants. It is also a soil that is reclaimable after the uppermost soil is stripped away.

Parameters used to rate soils for suitability for topsoil include: moist consistence, texture, thickness of material, coarse fragment content, presence of soluble salts, stoniness class, slope, and soil drainage class.

(i) **Pond Reservoir Areas**

Of primary concern are soil properties that affect seepage. Features and qualities affecting use are: permeability, depth to water table, depth to bedrock, and slope.

(j) Drainage for Crops and Pastures

Factors affecting suitability of soils for drainage are those that affect installation and performance of surface and subsurface drainage systems. These include: permeability, texture and structure, depth to bedrock, depth to water table, slope, stability of ditch banks, flooding or ponding, salinity and alkalinity, and availability of outlets.

Most soils in the map area are well drained and do not require artificial drainage for most crop production.

(k) Irrigation

Factors affecting the suitability of soils for irrigation include: available water storage capacity, depth of soil rooting zone, slope, rate of water intake (infiltration rate), need for drainage (depth to water table), salinity and alkalinity, stoniness, hazard of soil blowing, presence of restrictive layers, permeability below the surface layer, and hazard of water erosion.

(l) Potential Frost Action

Three classes of potential frost action are used: low, moderate, and high, and are based on pedological texture and/or the Unified Soil Classification system.

Table 26. Selected Interpretations for Soils of the Ashcroft Map Area, based on Engineering Properties

Groups of Soil Associations or Selected Components	Degree and Kind of Limitation for:					Suitability as Source of:			Soil Features Affecting:			
	Septic Tank Absorption Fields	Sewage Lagoons	Shallow Excavations	Sanitary Landfill	Local Roads & Streets	Road Fill	Sand and Gravel	Top Soil	Pond Reservoir areas	Drainage for Crops and Pasture	Irrigation	Potential Frost Action
Abbott, Ashton, Andrew, Aylmer,	slight: rapid permeability	severe: rapid permeability, coarse fragments	severe; stoniness	severe: rapid permeability	moderate to severe: stoniness	fair: stoniness	fair	poor: stoniness: <20 cm in thickness	unsuited: rapid permeability	not required	stoniness, variable slopes, low available water storage capacity, rapid infiltration	low
Blustery, Conant, Cavanaugh, Chasm, Crown Mountain, Clapperton, Cairn Mtn., Carson, Clemson, Chataway, Calling, Cochiwa, Curnow, Cedarbench	moderate if slope is <15%; severe if slope is >15%	severe: slopes >7%; seepage	severe: slopes >15%; seepage, stoniness, (rockiness)	severe: coarse texture; slopes >25%	severe: slopes >15%	fair: slopes 15-25% poor: slopes >25%	Blustery: unsuited; Conant, Clapperton, Chataway, Cavanaugh, Chasm, Crown Mtn., Cairn Mtn., Carson, Clemson, Calling, Curnow: poor Cochiwa, Cedarbench: fair	poor: stoniness; <20 cm in thickness; slopes >15%	unsuited: rapid permeability; slopes	non-arable	stoniness, excessive slopes, low available water storage capacity, essentially non-arable	low
Commonage, Courtney, Carabine, Cache Creek	slight if slope <8%; moderate if slope >8-15%	moderate: moderate to rapid permeability and occasional steep slopes	slight	slight	slight	fair: silty texture	unsuited to poor	seee Table 21 & 22	unsuited: rapid permeability	not required	shallow soils, moderate available water storage capacity	high
BL5,6, CA5,6, CG5,6, CM5,6, CN5,6, CP5,6, CR5,6, CS5,6, CW5,6, CW5,6, CY5,6	severe: shallow to bedrock (<50 cm)	severe: bedrock at <50 cm	severe: bedrock @ <50 cm	severe: bedrock @ <50 cm	severe: bedrock @ <50 cm	severe: bedrock @ <50 cm	unsuited	unsuited: bedrock @ <50 cm	unsuited: bedrock @ <50 cm	non-arable	bedrock @ <50 cm; essentially non-arable	low
Kerr, Soues, Kha Lake, Kanaka, Klowa Creek, Kumkan, Klepi Lake, Kwoiek	severe: bedrock at <1 m.	severe: bedrock at <1 m.	severe: bedrock at <1 m.	moderate to severe: bedrock at <1 m.	severe: bedrock at <1 m.	severe: bedrock at <1 m.	unsuited	unsiuted: bedrock @ <1 m.	unsuited: bedrock @ <1 m.	non-arable	bedrock @ <1 m; essentially non-arable	low
Dominic, Flat Creek, Fleet Creek, Shumway, Scuitto	moderate to severe: fluctuating watertable and seasonal flooding.	severe: fluctuating watertable and seasonal flooding.	moderate to severe: fluctuating watertable; seasonal flooding.	severe: occasional flooding, fluctuating watertable.	moderate: fluctuating watertable, flooding.	poor: poorly drained.	poor: (unsuited for gravel)	fair: 20-40 cm thickness; shallow soil development.	unsuited: rapid permeability; watertable	well to imperfectly drained	moderate to low available water storage capacity; rapid to moderate rate of infiltration.	high to moderate

Table 26 (cont'd). Selected Interpretations for Soils of the Ashcroft Map Area, based on Engineering Properties

Groups of Soil Associations or Selected Components	Degree and Kind of Limitation for:					Suitability as Source of:			Soil Features Affecting:			
	Septic Tank Absorption Fields	Sewage Lagoons	Shallow Excavations	Sanitary Landfill	Local Roads & Streets	Road Fill	Sand and Gravel	Top Soil	Pond Reservoir areeas	Drainage for Crops and Pasture	Irrigation	Potential Frost Action
Frances, Frisken	severe: fluctuating watertable and flooding	severe: fluctuating watertable and flooding	severe: fluctuating watertable; flooding	severe: occasional flooding; fluctuating watertable	severe: flooding, fluctuating watertable	poor: poorly drained	poor: (unsuited for gravel)	poor: salinity; flooding; fluctuating watertable	unsuited: watertable, flooding	high watertable	moderate AWSC; requires drainage; salinity and alkalinity	high
Godey, Gorge Creek, Gisborne, Glimpse, Gwenn, Glossey, Holden, Inkoiko, Inkitseph, Izman Creek	slight: rapid permeability	severe: rapid permeability, coarse texture.	severe: stoniness.	severe: coarse texture.	moderate to severe: stoniness.	fair to poor: stoniness	good	poor: stoniness, <20cm thickness.	unsuited: rapid permeability	rapid to well drained.	low AWSC; susceptibility to soil blowing; rapid, infiltration.	low
Lac du Bois, Lundbom, Laluwissen	severe: moderately slow permeability and slope stability	severe: (piping)	slight: except near bluffs or at base of slopes	moderate: fine texture	severe: fine texture	poor: fine texture	unsuited	fair: 20-40 cm thickness; 8-15% slope	unsuited: susceptibility to piping	well drained	high AWSC; shallow soils; erosion hazard; soil pipng/slumping hazard.	high
Meander, Medicine, Maiden, Mellin, McKnight, McLaren, Minnie, McQueen, Mossey, Spius Creek, Tullee, Trachyte, Timber, Trapp Lake, Tranquille, Bowman, Tunkwa, Truda Mtn., Saatin	moderate: 0-15% slopes severe: >15% slopes (compact horizon at depth <1 m)	slight: <2% slopes moderate: 2-7% slopes severe: >7% slopes	slight: 0-8% slopes moderate: 8-15% slopes severe: >15% slopes	slight: <15% slopes moderate: slopes 15-25% severe: slopes >25%	severe: slopes >15%, frost action	poor: fine texture, slopes >25%	unsuited	see Table 21 & 22	good: moderate permeability, poor: slopes >15%	well drained except in areas where seepage occurs.	high to moderate AWSC, variable topography, some steep slopes, erosion hazard, (generally good soils).	high
MA5,6, MC5,6, MD5,6, MG5,6, ML5,6, MN5,6, MQ5,6, MS5,6, SP5,6, TE5,6, TH5,6, TM5,6, TP5,6, TQ5,6, TW5,6, TU5,6, BW5,6	severe: shallow to bedrock (<50 cm)	severe: bedrock at <50 cm	severe: bedrock at <50 cm	severe: bedrock at <50 cm	severe: bedrock at <50 cm	poor: bedrock at <50 cm	unsuited	unsuited	unsuited: bedrock at <50 cm	non-arable	bedrock at <50 cm, essentially non-arable	low

Plate 6. East of Kamloops along the South Thompson River

Note the deeply gullied lacustrine silts along the South Thompson River. Soils of the Lundbom association occur here. The soils in the grasslands along Paul Creek are primarily developed in fluvioglacial materials which are coarse textured and rapidly drained. B.C. Photo 359:73.

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Plate 7. West of Kamloops to Savonna

The grasslands north of Brocklehurst occur on soils of the Godey, McKnight and Aylmer associations, mostly derived from fluvioglacial, moraine, and ablation moraine parent materials. Brocklehurst is situated on coarse textured, fluvial deposits on which the Flat Creek soil association has developed. The soils developed on the light-toned, silty lacustrine deposits south of the Thompson River belong to the Lundbom association. Lying above the Lundbom association are the Brown Chernozem soils of the Tranquille association which have developed on morainal materials. B.C. Photo 356:81.

Appendix A
Previous Soil Surveys

A.1 Previous Soil Surveys Within the Ashcroft Map Area

At the request of the Comptrolier of Water Rights a soil survey was made of arable land along a portion of the Thompson River (Sprout and Kelly, 1963). Soils series were mapped at a detailed scale 1:15,840 (4 inch:mile). The area surveyed covered 5,130 acres west of Savonna along the Thompson Valley to Basque and along the Bonaparte and Deadman rivers. Twenty-three series were defined, described and rated for irrigation and area summaries given. Soil series are much more detailed than soil associations and it is strongly recommended that the more detatiled survey (Sprout and Kelley, 1963) be used for land evaluation and management decisions in the area covered by this survey. Table 27 shows the soil association names into which the more detailed series best seem to fit. This table was compiled by comparison of mapping in the same areas for this survey and the earlier survey. The emphasis has not been on correlation between the 1963 and 1973 classification systems; the emphasis has been on what map units have been used in the same areas for each survey.

Another soils map was prepared by Canada Department of Agriculture (1971) entitled Preliminary Soils Map for the part of the Kamloops Research Station at a scale of 1;50 000.The area covered by this map is west of the North Thompson River to the eastern end of Kamloops Lake extending north to 120°15' N latitude. Ten major map units were defined. This soil map and legend are not generally available and the work has been superceded by this soil survey report.

Table 27. Correlation between Soil Associations of this Report and Soil Series in Sprout and Kelley, 1963.

This Report		Sprout and Kelley, 1963		
Map Symbol	Soil Association Name and (Soil Classification)	Map Symbol	Soil Series Name	Soil Classification
CB	Carabine (Orthic Brown)	BN	Bonaparte	Rego Brown
		CH	Chrome	Mull Regosol
CC	Cache Creek (Calcareous Rego Brown)	BN	Bonaparte	Rego Brown
		CT	Cheetsum	Rego Brown
		MT	Minaberriat	Saline Gleysol
		TL	Taweel	Rego Brown
		IT	Tremont	Saline Meadow
CT	Courtney (Orthic Brown)	BS	Barnes	Mull Regosol
		SE	Semlin	Orthic Brown
		TL	Taweel	Rego Brown
		TS	Tsotin	Mull Regosol
FS	Frances (Gleyed Cumulic Regosol)	AY	Anglesey	Rego Brown
		CH	Chrome	Mull Regosol
		CR	Carquille	Gleyed Mull Regosol
FR	Frisken (Gleyed Saline Regosol)	BN	Bonaparte	Rego Brown
		CR	Carquille	Gleyed Mull Regosol
		TL	Taweel	Mull Regosol
GD	Godey (Orthic Brown)	AY	Anglesey	Rego Brown
		BE	Basque	Orthic Brown
		NE	Nepa	Orthic Brown
		WA	Walhachin	Orthic Brown
LM	Lundbom (Orthic Brown)	MA	McAbee	Orthic Brown
		VS	Venables	Calcareous Meadow
	No equivalent soil association as no associations were defined as having developed on aeolian materials.	JS	Joeross	Rego Brown
		LZ	Lopez	Rego Brown
		SV	Savona	Mull Regosol

A.2 Soil Surveys in Areas Adjacent to the Ashcroft Map Area

Figure 28 shows the areas adjacent to the Ashcroft map area that have been surveyed for soils and landforms. Some of these reports contain additional information on soil associations described within this report (Valentine, 1980; Gough, 1988; Kowall, 1980). Within Chapter Four, the soil associations which have been described and mapped outside the Ashcroft map area are referenced to the appropriate report by a superscript.

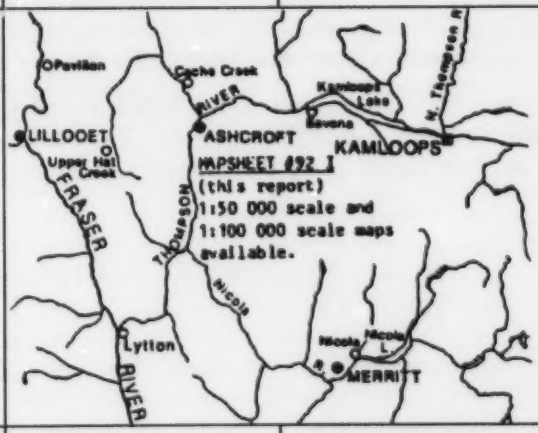
<table>
<tr>
<td>MAPSHEET #92O
Soils of the Taseko Lakes Area.
K. Valentine, W. Watt & A. Bedway. 1987</td>
<td>MAPSHEET #92P W1/2.
Soils of the Lac La Hache – Clinton Area.
K. Valentine.
1980.</td>
<td>MAPSHEET #92P E1/2.
Soils of the Bonaparte River – Canim Lake Map Area
N. Gough.
1988.</td>
<td>MAPSHEET #82M.
Soil and Terrain of the Seymour Arm Area.
R.C. Kowall.
1980.</td>
</tr>
<tr>
<td>MAPSHEET #92J
not surveyed</td>
<td colspan="2"> 
</td>
<td>MAPSHEET #82L.
Soils of the Vernon Map Area.
R.C. Kowall.
(maps only)</td>
</tr>
<tr>
<td>MAPSHEET #92G
not surveyed</td>
<td>MAPSHEET 92H/NW
not surveyed</td>
<td>MAPSHEET 92H/NE
Soils of the Tulameen Area of British Columbia.
T. Lord and A. Green.
1974.</td>
<td>MAPSHEET #82E.
Soils of the Penticton Map Area.
R.C. Kowall.
(maps only)</td>
</tr>
</table>

Figure 28. Soils – landform maps and reports for areas adjacent to the Ashcroft map area.

The map unit boundaries along the eastern edge of the survey area correspond to those within the Vernon map area (82 L). Soil association symbols along the southern part do not necessarily correspond. The approximate equivalent soil associations between these two areas are:

Ashcroft, 92 I	–	**Vernon, 82 L**
Gorge Creek (GG)	–	equivalent to Henning (HE)
Chataway (CY)	–	equivalent to Bankier (BA)
Mellin (ME)	–	equivalent to Grant (GR)

The map unit boundaries along the northeastern edge of the survey area correspond to those within the Bonaparte River-Canim Lake map area (92 P/E 1/2). Some of the map unit symbols do not correspond along this boundary and it is recommended that if working in areas along this boundary the soils legend for each area be consulted separately to determine the soils.

The map unit boundaries along the northwestern edge of the survey area generally correspond to those map units shown for the Lac La Hache-Clinton Area (92 P W 1/2). The soil associations are generally mapped the same but the components are defined differently. It is recommended that if working in an area along this boundary the soils legends and reports for each area be consulted separately to determine the soils.

The soil catenas and series mapped and defined by Lord and Green, 1974 were not incorporated within the Ashcroft soils report. The report (Lord and Green, 1974) is somewhat more general, and should be consulted especially along the area where the two surveys adjoin each other (west from Pennask Lake along the 50th parallel).

Table 28 gives the approximate equivalents between soil units mapped within the Tulameen survey and the Ashcroft map area. The table has been compiled by matching units and boundaries along the boundary of the survey areas.

Table 28. Correlation between Tulameen Soils Map and Report (Lord and Green, 1974) and Soils Mapped in the Ashcroft Map Area

Tulameen – soils mapped at a more general scale (1:126 720) – fewer map symbol complexes – soil mapped at a catena level – series within catenas defined			Ashcroft – soils mapped on 1:70 000 photographs and presented at both 1:50 000 and 1:100 000 scales. – more delineations and complex map symbols – soils mapped at soil association level – series not defined		
Map Symbol	Map Unit Name	Soil Classification	Map Symbol	Soil Association Name	Soil Classification
Bd	Brenda	Orthic Dark Gray Chernozem	TH	Trachyte	Orthic Black Chernozem
Bt	Britton	Orthic Gray Luvisol	TW CM	Tunkwa Chasm	Orthic Gray Luvisol Degraded Eutric Brunisol
Cn	Connaly	Orthic Gray Luvisol	AB CG	Abbott Cavanaugh	Orthic Dystric Brunisol Degraded Eutric Brunisol
Fa	Fairweather	Eluviated Black Chernozem	TE TH	Tullee Trachyte	Orthic Black Chernozem Orthic Black Chernozem
Ho	Howarth	Orthic Dark Gray Chernozem	LS	Laluwissen	Orthic Dark Brown Chernozem
Md	Midday	Orthic Gray Luvisol	CO GY	Commonage Glossey	Orthic Dystric Brunisol Degraded Eutric Brunisol
Mz	Mazama	Degraded Dystric Brunisol	AB GG	Abbott Gorge Creek	Orthic Dystric Brunisol Orthic Humo-Ferric Podzol
Wi	Wilbert	Degraded Dystric Brunisol	CP	Clapperton	Orthic Dystric Brunisol
Cy	Coley	Terric Mesisol	FR	Frisken	Gleyed Saline Regosol
Et	Etches	Terric Mesisol	O	Oregon Jack	Typic Mesisol
Tr	Trehearne	Degraded Eutric Brunisol	GN	Gisborne	Degraded Eutric Brunisol

Plate 8. South of Kamloops

Kamloops has expanded considerably since this 1947 aerial photograph was taken. Much of the expansion has been to the south and west on areas of the Godey soil association. These soils, developed in fluvioglacial materials, are coarse textured, rapidly drained and have shallow Eutric Brunisol soil profiles. They are situated above the Lundlom soils which have developed on silty, erodible lacustrine deposits. Most of the grasslands between Kamloops and Knutsford are the Dark Brown Chernozem soils of the Trapp Lake and McQueen associations. The soils developed on the drumlinized moraine south of Knutsford are Black Chernozems and belong to the Tullee and Mossey soil associations. B.C. Photo 359:72.

Appendix B
List of Soil Profile Descriptions and Analyses For Soil Associations Sampled in the Ashcroft Map Area

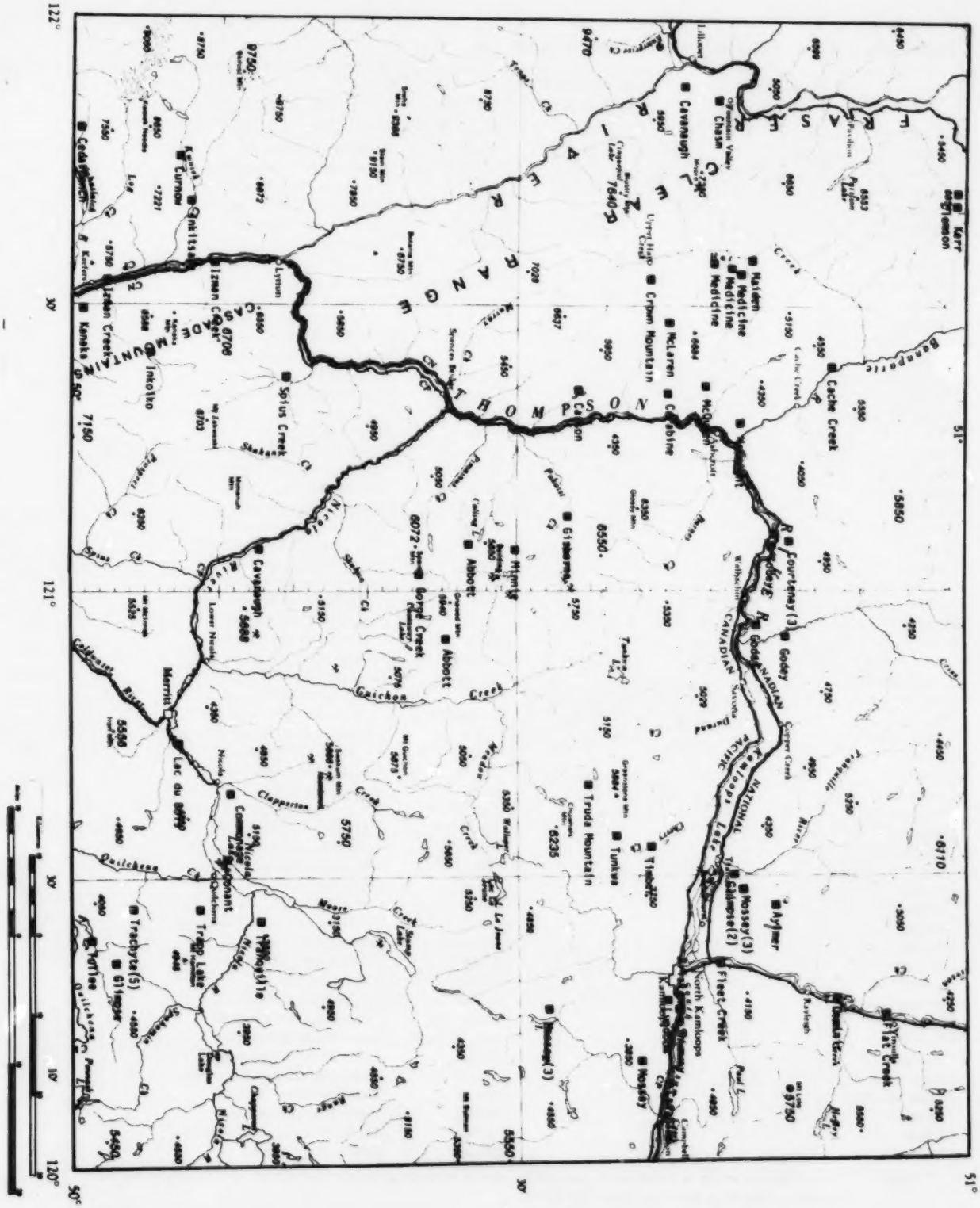
Table 29. List of Sampled Soil Associations

Soil Name**	Number of Profiles	Profile Description in Appendix C	Profile*	Soil Classification (1973)
Abbott	1	x	Modal	Orthic Dystric Brunisol
Abbott	1		Variant	Brunisolic Gray Luvisol
Aylmer	1		Modal	Orthic Black Chernozem
Cache Creek	1		Modal	Calcareous Rego Brown Chernozem
Carabine	1		Variant	Carbonated Orthic Dark Brown Chernozem
Carabine	1		Modal	Orthic Brown Chernozem
Carson	1		Modal	Degraded Eutric Brunisol
Cavanaugh	2	x	Modal	Degraded Eutric Brunisol
Cedarbench	1		Modal	Orthic Humo-Ferric Podzol
Chasm	1	x	Modal	Degraded Eutric Brunisol
Clemson	1	x	Modal	Orthic Humo-Ferric Podzol
Commonage	1		Modal	Orthic Dark Brown Chernozem
Conant	1		Modal	Degraded Eutric Brunisol
Courtney	1		Modal	Orthic Brown Chernozem
Courtney	2		Variant	Calcareous Brown Chernozem
Crown Mountain	1		Modal	Calcareous Dark Brown Chernozem
Curnow	1		Modal	Degraded Eutric Brunisol
Dominic	1		Variant	Carbonated Orthic Dark Brown Chernozem
Flat Creek	1		Variant	Orthic Dark Brown Chernozem
Fleet Creek	1		Modal	Degraded Eutric Brunisol
Frisken	1		Modal	Gleyed Saline Regosol
Gisborne	1	x	Modal	Degraded Eutric Brunisol
Glimpse	2		Modal	Orthic Dark Brown Chernozem
Glimpse	1		Variant	Orthic Black Chernozem
Godey	3	x	Modal	Orthic Brown Chernozem
Gorge Creek	1		Modal	Orthic Humo-Ferric Podzol
Inkitsaph	1		Modal	Degraded Dystric Brunisol
Inkoiko	1		Modal	Degraded Dystric Brunisol
Izman Creek	1		Variant	Degraded Dystric Brunisol
Izman Creek	1		Modal	Degraded Eutric Brunisol
Kanaka	1	x	Modal	Degraded Dystric Brunisol
Kerr	1		Variant	Lithic Orthic Melanic Brunisol
Lac du Bois	1		Modal	Solonetzic Dark Brown Chernozem
Lundbom	1	x	Modal	Orthic Brown Chernozem
McKnight	1	x	Modal	Orthic Brown Chernoxzem
McLaren	1	x	Modal	Orthic Gray Luvisol
McQueen	1	x	Modal	Orthic Dark Brown Chernozem
Maiden	1	x	Modal	Degraded Eutric Brunisol
Medicine	2		Modal	Calcareous Black Chernozem
Medicine	1		Variant	Calcareous Black Chernozem
Minnie	1		Modal	Orthic Gray Luvisol
Mossey	4	x	Modal	Orthic Black Chernozem
Mossey	1		Variant	Orthic Dark Brown Chernozem
Mossey	1		Variant	Orthic Black Chernozem
Shumway	1		Modal	Orthic Brown Chernozem
Spius Creek	1		Modal	Orthic Gray Luvisol
Timber	1	x	Modal	Degraded Eutric Brunisol
Trachyte	3	x	Modal	Orthic Black Chernozem
Trachyte	2		(unspecified)	Orthic Black Chernozem
Tranquille	1		Modal	Orthic Brown Chernozem
Trapp Lake	1		Modal	Orthic Dark Brown Chernozem
Truda Mountain	1		Modal	Brunisolic Gray Luvisol
Tullee	1	x	Modal	Orthic Black Chernozem
Tullee	1		Variant	Orthic Dark Brown Chernozem
Tunkwa	1		Modal	Orthic Gray Luvisol

* Modal: The soil profile which is described represents the central concept of the soil association, and usually is the most commonly occurring soil within the association.

Variant: The profile varies from the central concept of the association i.e., not modal.

** The profile descriptions and analyses are stored in the B.C. Soil Information System.


122°
51°
30'
121°
50°
120°
Cache Creek
Ashcroft
Kamloops
Merritt
Lytton
Lillooket
Clinton
Savona
Logan Lake
Kamloops Lake
Courtenay (3)
Godey
Tranquille
Flat Creek
Fleet Creek
Aylmer
Rossay (3)
Rossland (2)
Hosfry
Tunkwa
Truda Mountain
Tranquille
Abbott
Gibraltar
Mamit
Cayoosh
Solus Creek
Intolito
Kanaka
Cedarbench
Curran
Gaitsas
Izman
Lytton
Trachyte (5)
Gilnore
Quilchena
Nicola Lake
Coquihalla
Clapperton
Gaichon Creek
Thompson
Fraser
Nicola
Canadian Pacific
National
Trans-Canada
Highway
Lac du Bois
Lac Le Jeune
Paul L.
Campbell
Kamloops
North Kamloops
Bonaparte
Cache Creek
Thompson
Nicola
Fraser
Canadian

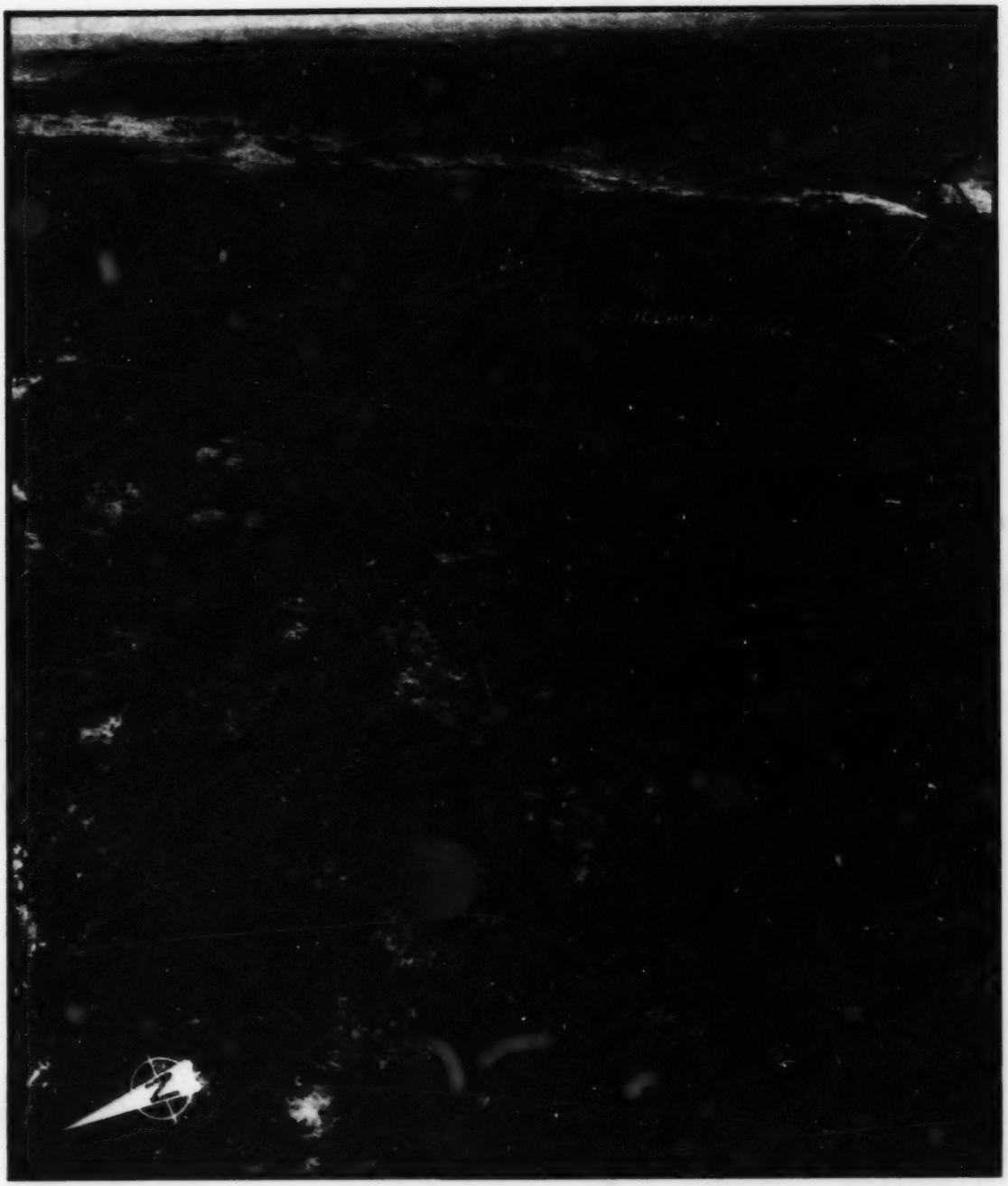


Plate 9. Thompson Plateau from Guichon Valley to Stump Lake

Much of the central portion of the Ashcroft map area is composed of alternating areas of deep and shallow morainal deposits. Soils developed from medium textured moraine have Gray Luvisol profiles and belong to the extensive Tunkwa association. Soils developed from somewhat coarser textured moraine have Eutric Brunisol soil development and belong to the Timber association. B. C. photo 651:39.

Appendix C
Selected Soil Profile Descriptions and Analyses for some of the more Extensive Soil Associations in the Ashcroft Map Area

Selected Soil Profile Descriptions and Analyses for some of the more Extensive Soil Associations in the Ashcroft Map Area

The Soil profile descriptions and analyses are also stored in the British Columbia Soil Information System (BCSIS) and are available on request. This data system is described in Sondheim M., and K. Suttie. 1983. *User Manual for the British Columbia Soil Information System.* (BCSIS – Volume 1). B.C. Ministry of Forests. 91 pp.

Abbott Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 25 00	Orthic Dystric Brunisol (1973)		% Slope:	5.0	Textural Modifier:	bouldery
Longitude (W):	120 55 00			Type:	complex	Genetic Modifier:	
Elevation (M):	1360	Status:	modal soil	Class:	undulating	Genetic Material	ablation moraine
N.T.S.:	92 I 7			Aspect (°)	72		
				Drainage:	well	Landform:	rolling plain
				Permeability:	rapid		
				Infiltration:	rapid		
				Stoniness:	excessive		

Profile Description

Horizon	Depth (cm)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
LFH	2-0	Abrupt, Smooth						
Bm	0-25	Gradual, Smooth			Sand, Very Gravelly	Single grain	Loose	Plentiful
BC	25-43	Gradual, Smooth			Loamy sand, Very Gravelly	Single grain	Loose	Plentiful
C	43-70				Loamy sand, Very Gravelly	Single grain	Loose	Few

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M $CaCl_2$)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
LFH	2-0	4.5	3.9	53.44	1.38		4.10	1.01	.24	.08	6.0
Bm	0-25	6.0	5.2	.25	.01		2.99	.82	.09	.18	4.6
BC	25-43	6.1	5.2	.16	.02		3.07	.85	.05	.42	11.3
C	43-70	6.0	5.2	.90	.06						

Horizon	Pyrophosphate Extractable		Elect. Cond. (MMHOS/Cm)	P:	S	Mn	Coarse Fragments				
	Fe%	Al%		ppm.	ppm.	ppm.	Total %Vol	Gravel %	Kind	Cobble %	Kind
LFH				24.5		88.4					
Bm				10.6	20.1	1.0	60	50	1*	10	1
BC				18.6	6.4	.7	60	50	1	10	1
C				175.1	4.8	2.7	80	50	1	30	1

*1 – Rounded

Cavanaugh Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 41 00	Degraded Eutric Brunisol (1973)		% Slope:	15.0	Textural Modifier:	gravelly
Longitude (W):	121 51 00			Aspect (°)	72	Genetic Material:	colluvial
Precision (sec):	60	Status:	modal soil	Microtopography:	slightly mounded	Landform:	fan
Elevation (M):	375					Rooting Depth:	100 cm
N.T.S.:	92 I 12			Drainage:	rapid	Stoniness:	excessive
Seepage:	absent			Runoff:	medium		
Flood Hazard:	no hazard			Permeability:	rapid		
				Infiltration:	rapid		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Roots
			Dry	Moist			
L	8-0	Abrupt, Smooth					
Ae	0-2	Clear, Smooth	2.5Y5.0/2.0	10.0YR3.0/2.0	Loamy sand, Gravelly	Single grain	Very Few, Micro, Horizontal
Bm1	2-8	Clear, Wavy	10.0YR5.0/2.0	10.0YR3.0/2.0	Loamy sand, Gravelly	Fine, Subangular Blocky	Very Few, Coarse, Horizontal, In Ped
Bm2	8-30	Clear, Smooth	2.5Y5.0/2.0	2.5Y4.0/2.0	Loamy sand, Gravelly	Fine, Subangular Blocky	Very Few, Fine, Horizontal, In Ped
Cck	50-66	Gradual, Smooth	2.5Y6.0/2.0	2.5Y4.0/2.0	Sand, Gravelly	Single grain	Very Few, Micro, Vertical
Ck1	66-100	Diffuse, Smooth	2.5Y6.0/2.0	2.5Y4.0/2.0	Sand, Gravelly	Single grain	Very Few, Micro, Veritcal
Ck2[1]	100-120		2.5Y6.0/2.0	2.5Y3.0/2.0	Sand, Gravelly		

1. Weak lime cementation, continuous

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M CaCl2)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ae	0-2	6.4	5.9	2.31	.12		9.46	2.66	.03	1.48	14.1
Bm1	2-8	6.7	6.3	1.77	.09		11.86	2.61	.03	1.21	14.7
Bm2	8-30	7.3	6.8	1.37	.06		12.50	2.15	.05	.39	12.9
Cck	30-66	7.9	7.5	.56	.04		22.37	1.21	.06	.19	7.0
Ck1	66-100	8.0	7.5	.54	.04	3.7	22.40	1.20	.08	.18	3.7
Ck2	100 - 120	8.2	7.6			3.5					

Horizon	Pyrophosphate Extractable		Elect. Cond. (MMHOS/Cm)	P1	S	Mn	Coarse Fragments				
	Fe%	Al%		ppm.	ppm.	ppm.	Total %Vol	Gravel %	Kind	Cobble %	Kind
Ae				63.1	1.5		25	25	1*		
Bm1	0.1	0.1		33.4	0.8		30	25	1	5	1
Bm2	0.1	0.1		23.6	0.9		30	25	1	5	1
Cck				5.0	0.6		30	25	1	5	1
Ck1				5.1	2.4		30	25	1	5	1
Ck2				5.5			30	25	1	5	1

*1 - Rounded

Chasm Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 43 00	Degraded Eutric Brunisol (1973)		% Slope:	70.0	Textural Modifier:	gravelly
Longitude (W):	120 55 00	Status:	modal soil	Type:	simple	Genetic Material	colluvial
Precision (sec):	60			Aspect (°):	30	Landform:	fan
Elevation (M):	940			Microtopography:	level	Permeability:	moderately rapid
N.T.S.:	92 I 12			Drainage:	well		
Seepage:	absent			Runoff:	very slow	Infiltration:	rapid
Flood Hazard:	no hazard					Stoniness:	very stony

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Roots
			Dry	Moist			
LF	4-0	Abrupt, Smooth	10.0YR3.0/2.0	10.0YR2.0/2.0			
Ae	0-1	Abrupt, Smooth	10.0YR4.0/3.0	10.0YR3.0/1.0	Loamy sand, Gravelly	Single grain	Few, Micro, Random, In Ped
Bm1	1-17	Diffuse, Smooth	7.5YR4.0/4.0	7.5YR3.0/2.0	Loamy sand, Gravelly	Single grain	Few, Micro, Random, In Ped
Bm2	17-44	Diffuse, Smooth	2.5Y5.0/4.0	10.0YR4.0/3.0	Loamy sand, Gravelly	Single grain	Few, Fine, Random, In Ped
Bm3	44-59	Diffuse, smooth	2.5Y5.0/4.0	10.0YR4.0/3.0	Sand, Gravelly	Single grain	Plentiful, Fine, Random, In Ped
C	59-90		10.0YR5.0/4.0	10.0YR3.0/4.0	Sandy loam, Gravelly	Single grain	Plentiful, Medium, Random, In Ped

Profile very friable throughout

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M CaCl2)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
LF	4-0	5.5	5.0	60.53	1.50						
Ae	0-1	6.5	6.0	3.54	.21		20.67	3.81	.05	.26	25.8
Bm1	1-17	6.4	5.8	1.63	.10		17.56	3.60	.15	.37	19.5
Bm2	17-44	7.0	6.4	.59	.03		11.61	2.57	.16	.17	12.2
Bm3	44-59	7.2	6.6	.67	.03		13.09	3.21	.16	.21	14.1
C	59-90	7.4	6.7				15.80	3.89	.17	.25	17.6

Horizon	Pyrophosphate Extractable		P1	S	Mn	Coarse Fragments						
	Fe%	Al%	ppm.	ppm.	ppm.	Total %Vol	Gravel %	Kind	Cobble %	Kind	Stone %	Kind
LF												
Ae			93.1	5.4		30	15	2	15	2		
Bm1	0.1	0.1	6.3	1.3		40	35	2	5	2		
Bm2	0.1	0.1	5.6	0.9		65	40	2	20	2	5	2
Bm3	0.1	0.1	4.6			65	40	2	20	2	5	2
C			5.1			65	40	1	20	2	5	2

*1 – Rounded 2 – Subrounded

Clemson Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 59 00	Orthic Humo-Ferric Podzol (1973)		% Slope:	40.0	Textural Modifier:	sandy
Longitude (W):	121 42 00			Type	simple	Genetic Material	colluvial
Precision (sec):	60	Status:	modal soil	Class:		Landform:	blanket
Elevation (M):	560			Aspect (°)	20		
		Seepage:	present	Microtopography:	level	**Bedrock**	
		Flood Hazard;	no hazard	Permeability:	moderately rapid	Type:	sedimentary calcareous limestone
		Drainage:	well drained				
		Runoff:	medium	Infiltration:	rapid		
				Stoniness:	moderate		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Roots
			Dry	Moist			
LF	6-0	Clear, Smooth					
Ah	0-9	Clear, Smooth	5.0YR3.0/2.0	5.0YR2.5/1.0		Weak, fine subangular Blocky	Abundant, Medium, Random, Ex Ped
Ae	9-12	Clear, Wavy			Sand	Single grain	Abundant, Medium, Random, Ex Ped
Bf	12-22	Clear, Wavy	10.0YR4.0/4.0	5.0YR4.0/3.0	Loamy sand	Single grain	Adundant, Medium, Random, Ex Ped
Bm	22-34	Clear, Wavy	2.5YR6.0/4.0	10.0YR3.0/3.0	Sand	Single grain	Plentiful, Medium, Random, Ex Ped
C	34-70		2.5YR5.0/2.0	2.5YR3.0/2.0	Coarse sand, Gravelly	Single grain	Few, Fine, Ex Ped

Consistence of Ah is very friable, rest of profile is loose

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M CaCl2)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
LF	6-0	5.8	5.3	45.28	.88						
Ah	0-9	5.3	4.6	6.07	.17						
Ae	9-12	5.0	4.3	1.96	.12		4.24	.99	.08	.43	13.5
Bf	12-22	5.2	4.6	1.81	.13		4.53	1.60	.09	.52	17.2
Bm	22-34	5.1	4.3	.62	.07		2.54	.89	.09	.30	9.7
C	34-70	5.5	4.7	.31	.05		3.85	.76	.06	.43	7.6

Horizon	Pyrophosphate Extractable		Elect. Cond. (MMHOS/Cm)	P1 ppm.	S ppm.	Mn ppm.	Coarse Fragments				
	Fe%	Al%					Total % Vol	Gravel %	Kind	Cobble %	Kind
LF											
Ah											
Ae				236.9	0.8		10	10	2*		
Bf	0.5	0.4		61.4	0.2		15	15	2		
Bm	0.1	0.2		19.7	0.3		15	15	2		
C							20	20	2		

*2. – Subrounded

Gisborne Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 33 00	Degraded Eutric Brunisol (1973)		% Slope:	10.0	Textural Modifier:	sandy
Longitude (W):	121 07 00	Status:	modal soil	Type:	simple	Genetic Material	colluvial
Precision (sec):	60			Aspect (°):	210	Landform:	blanket
Elevation (M):	1272			Drainage:	rapid		
N.T.S.:	92 I 11			Runoff:	very slow		
Seepage:	absent			Permeability:	rapid		
Flood Hazard:	no hazard			Infiltration:	rapid		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Roots
			Dry	Moist			
LH	2-0	Abrupt, Smooth					
Ae	0-15	Abrupt, Smooth			Sand, Gravelly	Single-grain	Plentiful
Bm	15-43	Gradual, Smooth			Coarse sand, Gravelly	Single-grain	Few
C	43-75				Coarse sand, Gravelly	Single-grain	Very Few

Profile very friable throughout

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M CaCl2)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
LH	2-0	5.2	4.8	25.57	1.37						
Ae	0-15	6.9	6.4	1.04	.06		6.47	1.79	.04	.73	8.8
Bm	15-43	6.8	6.3	.38	.03		3.95	1.66	.02	.48	6.3
C	43-	6.7	6.3	.42	.02		3.94	3.06	.04	.45	6.3

Horizon	Pyrophosphate Extractable		P1	S	Mn	Coarse Fragments						
	Fe%	Al%	ppm.	ppm.	ppm.	Total %Vol	Gravel %	Kind	Cobble %	Kind	Stone %	Kind
LH			44.1	109.1	31.5							
Ae			54.6	12.5	2.2	35	35	1*				
Bm			42.9	12.2	.8	35	30	1	5	1		
C			36.6	12.7	1.3	35	30	1	5	1		

*1 – Rounded

Godey Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 47 30	Orthic Brown (1971)		% Slope:	00.0	Textural Modifier:	sandy
Longitude (W):	121 05 00	Status:	modal soil	Class:	nearly level	Genetic Material	glaciofluvial
Elevation (M):	378			Aspect (°)	000	Landform:	terraced
N.T.S.:	92 I 14			Drainage:	rapid	Rooting Depth:	26 cm
				Permeability:	rapid		
Seepage:	absent			Infiltration:	rapid		
Flood hazard:	no hazard			Stoniness:	moderate		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Roots
			Dry	Moist			
Ah	0-15	Clear, Smooth	10.0YR5.0/3.0	10.0YR4.0/2.0	Sandy loam	Very Weak, Coarse, Subangular Blocky	Plentiful, Very Fine, Horizontal, In Ped
Bm	15-26	Clear, Smooth	10.0YR5.0/3.0	10.0YR3.0/3.0	Sand, Gravelly	Single grain	Plentiful, Fine, Vertical, Ex Ped
Ck	26-60				Sand, Gravelly	Single grain	Few, Micro, Vertical, Ex Ped

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M CaCl2)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ah	0-15	7.5	6.9	.90	.05	.1	13.00	4.50	.15	.50	6.7
Bm	15-26	7.5	7.1	.64	.07	.6	14.19	3.65	.18	.12	
Ck	26-60	8.2	7.6	.31	.04	4.9	19.81	2.26	.18	.08	

Horizon	Pyrophosphate Extractable		Elect. Cond. (MMHOS/Cm)	P1	S	Mn	Coarse Fragments				
	Fe%	Al%		ppm.	ppm.	ppm.	Total % Vol	Gravel %	Kind	Cobble %	Kind
Ah				12.2	2.7						
Bm	0.1	0.1		10.8	1.6		45	45	1*		
Ck				7.1	8.9		50	25	1	25	1

*1 – Rounded

Kanaka Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 01 05	Degraded Dystric Brunisol (1973)		% Slope:	52.0	Textural Modifier:	sandy
Longitude (W):	121 29 06	Status:	modal soil	Type:	simple	Genetic Material	colluvial
Precision (sec):	60	Phase:	moderately rocky	Aspect (°)	225	Landform:	veneer
Elevation (M):	353			Drainage:	well	Stoniness:	excessive
				Runoff:	medium		
Seepage:	absent			Permeability:	rapid		
Flood Hazard:	no hazard			Infiltration:	very rapid		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Roots
			Dry	Moist			
Ah	0-8	Clear, Smooth	7.5YR4.0/2.0	5.0YR3.0/1.0	Sandy loam, Gravelly	Fine, Subangular Blocky	Abundant, Medium, Random, Ex Ped
Ae	8-20	Clear, Smooth	10.0YR4.0/4.0	7.5YR3.0/2.0	Sand loam, Gravelly	Fine, Subangular Blocky	Plentiful, Medium, Random, Ex Ped
Bm1	20-38	Clear, Wavy	10.0YR6.0/4.0	10.0YR4.0/4.0	Loamy sand, Gravelly	Fine to Medium, Subangular Blocky	Plentiful, Medium, Random, Ex Ped
Bm2	38-61	Clear, Smooth	10.0YR6.0/4.0	10.0YR5.0/4.0	Loamy sand, Very Gravelly	Single grain	Plentiful, Medium, Random, Ex Ped
C	61-75	Abrupt	2.5Y6.0/4.0	10.0YR4.0/4.0	Sand, Very Gravelly	Single grain	Plentiful, Medium, Random, Ex Ped
R	75+						

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M CaCl2)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ah	0-8	6.4	5.8	7.78			22.00	2.33	.08	.65	33.8
Ae	8-20	5.9	5.3	3.11	.18		7.17	.58	.06	.37	17.0
Bm1	20-38	5.9	5.3	1.16	.08		3.44	.37	.04	.30	9.4
Bm2	38-61	5.8	5.2	.63	.05		4.25	.66	.04	.29	8.8
C	61-75	5.7	5.1								

Horizon	Pyrophosphate Extractable		Elect. Cond. (MMHOS/Cm)	P1 ppm.	S ppm.	Mn ppm.	Coarse Fragments				
	Fe%	Al%					Total % Vol	Gravel %	Kind	Cobble %	Kind
Ah				213.4	1.7		35	25	2*	10	2
Ae				129.7	0.6		40	25	2	15	2
Bm1	0.1	0.2		92.0	0.4		45	25	2	20	2
Bm2	0.1	0.1		24.4	1.0		65	50	2	15	2
C				19.1			80	50	2	30	2

*2 – Subrounded

Lundbom Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 41 00	Orhtic Brown (1973)		% Slope:	2.0	Textural Modifier:	silty
Longitude (W):	120 17 00	Status:	modal soil	Type:	simple	Genetic Material	lacustrine
Precision (sec):	60			Aspect (°)	0	Landform:	terraced
Elevation (M):	525			Microtopography:	moderately mounded	Rooting Depth:	54 cm
N.T.S.:	92 I 9			Seepage:	absent	Drainage:	well
				Flood Hazard:	no hazard	Runoff:	medium
						Permeability:	moderately slow
						Infiltration:	medium

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Roots
			Dry	Moist			
Ah	0-6	Clear, Smooth			Silt loam	Very Fine, Granular	Plentiful, Very Fine, Random
Bm	6-18	Abrupt, Smooth			Silt loam	Very Fine, Granular	Plentiful, Very Fine, Random
Cca	18-54	Clear, Smooth			Silt loam	Very Fine Granular, Pseudo	Very Few, Fine, Random
Csk	54-		2.5Y6.0/2.0	2.5Y4.0/2.0	Silt	Very Weak, Very Fine, Platy, Pseudo	Very Few, Fine, Random

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M CaCl2)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ah	0-6	6.9	6.3	1.71			10.45	4.53	.09	1.45	14.5
Bm	6-18	7.8	7.3	.79		.5	19.72	4.74	.13	.26	14.6
Cca	18-54	8.5	7.8	.49		7.1	23.97	6.62	.69	.33	10.2
Csk	54-	8.0	7.8	.19		3.6	39.35	8.62	2.96	1.53	11.3

Horizon	Pyrophosphate Extractable Fe%	Pyrophosphate Extractable Al%	Elect. Cond. (MMHOS/Cm)	P1 ppm.	S ppm.	Mn ppm.	Coarse Fragments				
							Total %Vol	Gravel %	Kind	Cobble %	Kind
Ah			.43	17.4	1.9						
Bm			.89	3.6	1.2						
Cca			.72	0.0	6.8						
Csk				6.1	598.2						

Maiden Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 45 30	Degraded Eutric Brunisol (1973)		% Slope:	12.0	Textural Modifier:	silty
Longitude (W):	120 39 00			Type:	complex	Genetic Material	morainal
Precision (sec):	60	Status:	modal soil	Aspect (°)	180	Landform:	blanket
Elevation (M):	970			Drainage:	well		
N.T.S.:	92 I 13			Runoff:	rapid	Stoniness:	slight
Seepage:	absent			Permeability:	moderate		
Flood Hazard:	no hazard			Infiltration:	medium		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
LF	2-0	Abrupt, Smooth						
Ae	0-8	Abrupt, Smooth			Sandy loam	Platy	Soft	Abundant
Bm	8-23	Abrupt, Smooth			Silty clay loam	Subangular Blocky	Slightly Hard	Few
Ck1	23-71	Gradual, Smooth	10.0YR6.0/3.0	10.0YR5.0/30	Silt loam, Gravelly	Subangular Blocky, Pseudo	Hard	Few
Ck2	71-100				Silt loam, Gravelly	Subangular Blocky, Pseudo	Hard	Very Few

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M CaCl2)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
LH	2-0	6.1	5.3	34.02	1.18						
Ae	0-8	6.6	6.1	3.18	.20		17.54	7.06	.08	1.54	29.2
Bm	8-23	6.6	6.3	1.89	.13		20.03	8.56	.26	1.07	27.8
Ck1	23-71	8.0	7.3	1.45	.09		25.11	14.95	.73	.75	22.5
Ck2	71-100	8.3	7.3								

Horizon	Pyrophosphate Extractable Fe%	Pyrophosphate Extractable Al%	Elect. Cond. (MMHOS/Cm)	P1 ppm.	S ppm.	Mn ppm.	Coarse Fragments				
							Total %Vol	Gravel %	Kind	Cobble %	Kind
LH				35.8	67.6	14.6					
Ae			.72	46.0	9.7	1.6	5	5	1*		
Bm			.65	66.8	11.6	.3	10	10	1		
Ck1			.84	2.9	32.1	.2	25	25	1		
Ck2			.75	6.8	45.4	.2	25	25	1		

*1 – Rounded

McKnight Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 44 05	Orthic Brown (1973)		% Slope:	2.0	Textural Modifier:	silty
Longitude (W):	121 18 05			Type:	complex	Genetic Material	morainal
Precision (sec):	60	Status:	modal soil	Class:	undulating	Landform:	blanket
Elevation (M):	480			Aspect (°)	360		
N.T.S.:	92 I 11			Drainage:	well	Stoniness:	slightly
Seepage:	absent			Runoff:	medium		
Flood Hazard:	no hazard			Permeability:	moderately rapid		
				Infiltration:	medium		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
Ah	0-10	Gradual, Smooth			Loam		Friable	Abundant
Bm	10-28	Abrupt, Smooth			Loam	Weak, Fine to Medium, Subangular Blocky	Friable	Few
Cca	28-58	Gradual, Smooth			Loam	Moderate, Medium to Coarse, Subangular Blocky, Pseudo	Very Hard	Very Few
Csk	58-75				Loam	Moderate, Medium to Coarse, Subangular Blocky, Pseudo	Very Hard	Very Few

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M $CaCl_2$)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ah	0-10	7.4	6.5	2.69	.12		8.94	3.22	.05	.61	16.0
Bm	10-28	7.8	6.7	1.69	.13		10.80	4.48	.07	.27	15.0
IICk	28-58	7.9	7.2	1.25	.08		23.81	6.48	.14	.17	8.3
IICsk	58-75	7.9	7.2	.74	.05		48.91	10.66	1.23	.36	10.3

Horizon	Pyrophosphate Extractable Fe%	Al%	Elect. Cond. (MMHOS/Cm)	P1 (ppm)	S (ppm)	Mn (ppm)	Coarse Fragments				
							Total % Vol	Gravel %	Kind	Cobble %	Kind
Ah			.41	16.6	8.6	.5	5	5			
Bm			.62	4.8	9.9	.5	15	15			
IICk			3.11	1.4	40.3	2.3	15	15			
IICsk			5.57	7.2	94.8	.1	15	15			

McLaren Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 40 00	Orthic Gray Luvisol (1973)		% Slope:	40.0	Textural Modifier:	silty
Longitude (W):	121 28 00	Status:	modal soil	Type:	simple	Genetic Material	morainal
Precision (sec):	60			Class:	very steeply sloping	Landform:	blanket
Elevation (M):	1450			Aspect (°)	225	Stoniness:	moderate
N.T.S.:	92 I 11			Drainage:	well		
Seepage:	present			Runoff:	medium		
Flood Hazard:	no hazard			Permeability:	moderate		
				Infiltration:	medium		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
LH	2-0	Abrupt, Smooth	10.0YR2.0/2.0	10.0YR2.0/2.0				
Ae	0-18	Abrupt, Smooth	10.0YR5.0/3.0	5.0YR3.0/3.0	Loam	Moderate, Fine to Medium, Platy	Soft	Abundant
Bt	18-43	Gradual, Smooth	10.0YR4.0/3.0	5.0YR3.0/3.0	Sandy loam to Loam	Strong, Coarse Sub-angular Blocky	Hard	Plentiful
BC	43-63	Abrupt, Smooth	10.0YR5.0/2.0	10.0YR3.0/4.0	Sandy loam	Moderate, Coarse Subangular Blocky	Hard	Plentiful
Cca	63-104	Gradual, Smooth	10.0YR6.0/3.0	10.0YR4.0/2.0	Sandy loam	Medium, Coarse Subangular Blocky Pseudo	Hard	Few
Ck	104-120		10.0YR6.0/3.0	7.5YR4.0/2.0	Sandy loam	Moderate, Coarse, Subangular Blocky, Pseudo	Hard	Very Few

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH $CaCl_2$	Organic Carbon	Nitrogen %	Exchangable Cations (me/100g)				C. E. C.	Elect. Cond. (mS/cm)	P1 ppm.	S ppm.	Mn ppm.
						Ca	Mg	Na	K					
LH	2-0	6.5		32.46	1.31									
Ae	0-18	6.6	6.1	2.26	.16	13.32	2.14	1.02	1.02	16.0	.45	18.8	54.7	.7
Bt	18-43	6.5	5.9	1.64	.10	17.42	2.86	.17	1.22	25.1	.30	25.4	9.6	12.4
BC	43-63	7.0	6.5	1.90	.13	17.42	2.74	.05	.62	19.7	.74	26.6	12.2	8.9
Cca	63-104	7.7	7.1								.49	33.4	9.3	35.9
Ck	104-120	7.7	7.1								.35	5.9	13.9	8.8
												1.8	16.2	2.1

Horizon	Part. Size Analy. (% Passing)										Coarse Fragments				
	1 in. %	3/4 in. %	3/8 in. %	#4 %	#10 %	#20 %	#40 %	#60 %	#140 %	#200 %	Total % Vol	Gravel %	Kind	Cobble %	Kind
LH															
Ae															
Bt											13	10	1*	3	1
BC											13	10	1	3	1
Cca											13	10	1	3	1
Ck	97.12	93.32	84.39	74.36	56.11	24.89	12.71	11.49	9.70	9.39	20	15	1	5	1
											20	15	1	3	1

*1 - Rounded

McQueen Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N)	50 42 05	Orthic Dark Brown (1973)		% Slope	5.0	Textural Modifier	silty
Longitude (W)	121 22 05			Type	simple	Genetic Material	morainal
Precision (sec)	60	Status	modal soil	Aspect (°)	23	Landform	blanket
Elevation (M)	610			Drainage	well	Stoniness	slightly
N.T.S.	92 I 11			Runoff	medium		
				Permeability	moderately rapid		
				Infiltration	medium		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
Ah	0-13	Abrupt, Smooth			Fine sandy loam	Platy	Friable	Abundant
Bm	13-30	Abrupt, Smooth			Loam	Subangular Blocky	Slightly Hard	Plentiful
Cca	30-63	Abrupt, Smooth			Loam	Subangular Blocky, Pseudo	Hard	Few
Ck	63-90				Loam	Subangular Blocky, Pseudo	Hard	Few

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M $CaCl_2$)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ah	0-13	6.7	6.2	6.45	.20		7.65	5.52	.09	1.05	16.4
Bm	13-30	7.6	7.2	4.03	.12		4.72	10.21	.69	1.25	17.1
Cca	30-63	8.2	8.0	.73	.07		30.26	9.51	1.73	.22	6.4
Ck	63-90	7.9	7.9								

Horizon	Pyrophosphate Extractable Fe%	Pyrophosphate Extractable Al%	Elect. Cond. (MMHOS/Cm)	P1 (ppm)	S (ppm)	Mn (ppm)	Coarse Fragments				
							Total % Vol	Gravel %	Kind	Cobble %	Kind
Ah				29.0	10.8	2.4	5	5	1*		
Bm				4.5	63.7	1.6	5	5	1		
Cca				.3	10.5	1.0	10	5	1		
Ck				2.0	16.4	1.2	10	5	1	5	1

*1 - Rounded

Mossey Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 38 00	Orthic Black (1973)		% Slope:	2.0	Textural Modifier:	silty
Longitude (W):	120 12 30			Type:	complex	Genetic Material:	morainal
Precision (sec):	60	Status:	morial soil	Aspect (°)	270	Landform:	blanket
Elevation (M):	970			Drainage:	well	Stoniness:	slightly
N.T.S.:	92 I 9			Runoff:	slow		
Seepage:	absent			Permeability:	moderately rapid		
Flood Hazard:	no hazard			Infiltration:	rmedium		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
Ah	0-18	Clear		2.5YR3.0/2.0	Loam	Granular	Soft	Abundant
Bm1	18-30	Gradual		10.0YR4.0/3.0	Loam	Granular	Soft	Abundant
Bm2	30-50	Gradual		10.0YR4.0/4.0	Silt loam	Subangular Blocky	Slightly Hard	Few
Btj	50-76	Abrupt		10.0YR4.0/4.0	Silt loam	Angular Blocky		Few
Cca	76-119			10.0YR3.0/4.0	Silt loam	Subangular Blocky		

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M $CaCl_2$)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ah	0-18	6.3	5.9	4.51	.31		15.15	3.07	.05	1.28	20.2
Bm1	18-30	6.8	6.2	1.05	.10		10.74	2.79	.06	.86	14.2
Bm2	30-50	7.1	6.3	.77	.06		9.22	2.84	.10	.74	14.3
Btj	50-76	7.4	6.7	.70	.05		10.39	3.06	.13	.48	14.1
Cca	76-119	8.2	7.4								

Horizon	Pyrophosphate Extractable		P1 (ppm)	P2 (ppm)	S (ppm)	Mn (ppm)	Coarse Fragments				
	Fe%	Al%					Total % Vol	Gravel %	Kind	Cobble %	Kind
Ah			21.0	58.0	11.3	0.9					
Bm1			33.7	62.9	8.4	1.3					
Bm2			42.5	132.4	9.8	0.8					
Btj			49.9	203.5	8.5	0.7					
Cca			16.9	61.8	7.0	0.5					

Timber Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 39 00	Degraded Eutric Brunisol (1973)		% Slope:	7.0	Textural Modifier:	silty
Longitude (W):	120 33 00			Type:	simple	Genetic Material	morainal
Precision (sec):	60	Status:	modal soil	Aspect (°)	270	Landform:	veneer
Elevation (M):	960			Drainage:	well	Stoniness:	slightly
N.T.S.:	92 I 10			Runoff:	medium		
Seepage:	absent			Permeability:	moderately rapid		
Flood Hazard:	no hazard			Infiltration:	medium		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
L	1-0	Abrupt, Smooth						
Ae	0-5	Gradual, Smooth	10.0YR5.5/5.0	10.0YR5.0/2.0	Sandy loam, Gravelly	Moderate, Fine to Medium, Platy	Friable	Plentiful
Bm1	5-11	Gradual, Smooth	10.0YR5.0/3.0	10.0YR4.0/3.0	Loam, Gravelly	Very Weak, Medium to Coarse, Prismatic	Slightly Sticky, Friable, Slightly Hard	Plentiful
Bm2	11-18	Abrupt, Smooth	10.0YR5.0/3.0	10.0YR4.5/4.0	Loam, Gravelly	Very Weak, Medium to Coarse, Prismatic	Slightly Sticky, Friable, Slightly Hard	Plentiful
Ck1	18-34	Gradual, Smooth	10.0YR6.0/2.5	10.0YR5.0/3.0	Silty clay loam, Gravelly	Moderate to Strong, Subangular Blocky, Pseudo	Slightly Sticky, Very Hard	Few
Ck2	34-60		10.0YR6.0/2.0	10.0YR4.0/4.0	Silty clay loam, Gravelly	Moderate to Strong, Subangular Blocky, Pseudo	Slightly Sticky, Very Hard	Very Few

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M $CaCl_2$)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
L	1-0	5.9	5.4	26.68	.70						
Ae	0-5	6.6	6.0	2.38	.09		15.02	5.07	.13	.74	21.1
Bm1	5-11	6.7	6.2	2.95	.05		19.06	8.25	.07	.86	27.1
Bm2	11-18	7.3	6.6	.91	.03		20.80	7.77	.06	.57	21.3
Ck1	18-34	8.2	7.1	1.02	.02		23.68	4.34	.08	.30	13.4
Ck2	34-60	8.4	7.4								

Horizon	Pyrophosphate Extractable		Elect. Cond. (MMHOS/Cm)	P1 (ppm)	S (ppm)	Mn (ppm)	Coarse Fragments				
	Fe%	Al%					Total % Vol	Gravel %	Kind	Stone %	Kind
L				82.4	81.5	50.9					
Ae			.53	48.8	9.0	20.4	35	25		10	
Bm1			.37	60.6	10.5	1.3	35	25		10	
Bm2			.65	87.0	10.4	.7	35	25		10	
Ck1			.47	2.2	18.2	.1	35	25		10	
Ck2			.49	3.1	17.9	66.5	35	25		10	

Trachyte Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 04 00	Orthic Black (1973)		% Slope:	4.0	Textural Modifier:	silty
Longitude (W):	120 26 00			Type:	simple	Genetic Material	morainal
Precision (sec):	60	Status:	modal soil	Aspect (°)	0	Landform:	blanket
Elevation (M):	1150			Drainage:	well	Stoniness:	slightly
N.T.S.:	92 I 1			Runoff:	medium		
Seepage:	absent			Permeability:	moderately rapid		
Flood Hazard:	no hazard			Infiltration:	medium		

Profile Description

Horizon	Depth (cm)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
Ah	0-25	Abrupt, Smooth	7.5YR3.0/2.0	10.0YR2.0/1.0	Silt loam	Moderate, Medium, Granular	Soft	Abundant
Bm	25-46	Abrupt, Smooth	10.0YR5.0/3.0	10.0YR3.0/3.0	Silt loam, Gravelly	Moderate, Coarse, Subangular Blocky	Slightly Hard	Plentiful
Cca	46-71	Abrupt, Smooth	10.0YR6.0/3.0	10.0YR5.0/3.0	Silt loam, Gravelly	Strong, Coarse, Subangular Blocky	Very Hard	Very Few
Csk	71-100		10.0YR5.0/4.0	2.5Y4.0/2.0	Silt loam, Gravelly	Strong, Coarse, Subangular Blocky, Pseudo	Very Hard	Very Few

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M $CaCl_2$)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ah	0-25	6.2	5.9	5.68	.29		10.49	6.32	.33	1.14	21.6
Bm	25-46	7.6	6.8	1.05	.05		4.56	9.51	2.13	.64	15.2
Cca	46-71	8.3	7.4	2.70	.04		44.90	9.49	3.39	.40	10.9
Csk	71-100	7.9	7.3				22.98	8.56	3.38	.34	10.3

Horizon	Pyrophosphate Extractable		Elect. Cond. (MMHOS/Cm)	P1 (ppm)	S (ppm)	Mn (ppm)	Coarse Fragments				
	Fe%	Al%					Total % Vol	Gravel %	Kind	Cobble %	Kind
Ah			.42	20.3	15.2	.5					
Bm			2.42	16.3	82.5	.2	30				
Cca			8.41	8.8		.4	30				
Csk			8.27	3.4		.3	30				

Tullee Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 02 00	Orthic Dark Brown (1973)		% Slope:	6.0	Textural Modifier:	silty
Longitude (W):	120 24 00	Status:	variant soil	Type:	complex	Genetic Material:	morainal
Elevation (M):	1067		(Saline)	Aspect (°)	126	Landform:	plain
N.T.S.:	92 I 1			Profile Site:	lower slope	Stoniness:	slightly
				Drainage:	well		
				Runoff:	slow		
				Permeability:	moderate		
				Infiltration:	rapid		

Profile Description

Horizon	Depth (cm)	Horizon Boundary	Colour Crushed		Texture	Structure	Roots
			Dry	Moist			
Ah	0-12	Gradual, Smooth	10.0YR4.0/2.0	10.0YR3.0/2.0	Loam	Very Weak, Medium to Coarse, Subangular Blocky	Abundant, Micro, Random, In Ped
Ab	12-20	Clear, Smooth	10.0YR4.0/2.0	10.0YR3.0/2.0	Loam	Weak, Medium to Coarse, Subangular Blocky	Plentiful, Micro, Random, In Ped
Bm	20-48	Clear, Smooth	10.0YR5.0/2.0	10.0YR4.0/2.0	Silt loam	Moderate to Strong, Fine to Medium, Subangular Blocky	Few, Micro, Random, In Ped
Csca	48-65	Clear, Smooth	2.5Y6.5/2.0	2.5Y5.0/2.0	Silt loam	Moderate to Strong, Coarse, Subangular Blocky, Pseudo	Very Few, Micro, Random, In Ped
Csk	65-100		10.0YR6.5/1.0	2.5Y4.5/2.0	Silt loam	Moderate to Strong, Fine Subangular Blocky, Pseudo	

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M $CaCl_2$)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
Ah	0-12	6.9	6.2	2.23	.16		8.25	5.70	.47	1.27	15.2
AB	12-20	6.8	6.2	1.21	.09		5.71	6.79	1.22	.98	15.1
Bm	20-48	7.3	7.1	.82	.07		5.56	11.50	6.05	.90	13.0
Csca	48-65	8.5	8.5	.22	.02	8.2	30.54	9.04	6.41	.44	8.6
Csk	65-100	8.3	8.0			3.9					

Horizon	Elect. Cond. (mS/cm)	P1 (ppm)	S (ppm)	Moisture Status			Coarse Fragments				
				1/10 BAR.	1/3 BAR.	15 BAR.	Total %Vol	Gravel %	Kind	Cobble %	Kind
Ah	.65	15.8	2.0	42.5	24.9	10.2					
AB	1.86	10.2	10.6	31.8	21.8	9.7	1	1	1*		
Bm		9.1	91.9	25.9	19.2	7.2	5	5	1		
Csca	13.23	4.6	735.2	27.4	20.8	7.0	15	13	1	2	1
Csk	8.14	3.5		21.2	16.3	5.7	2	2	1		

*1 - rounded

Tunkwa Soil Association

Location		Classification		Site		Parent Material & Landform	
Latitude (N):	50 37 00	Orthic Gray Luvisol (1973)		% Slope:	15.0	Textural Modifier:	silty
Longitude (W):	120 35 00	Status:	modal soil	Type:	simple	Genetic Material	morainal
Precision (sec):	60			Aspect (°)	0	Landform:	blanket
Elevation (M):	1250			Drainage:	well		
N.T.S.:	92 I 10			Runoff:	rapid	Stoniness:	slightly
Seepage:	absent			Permeability:	moderately rapid		
Flood Hazard:	no hazard			Infiltration:	medium		

Profile Description

Horizon	Depth (CM)	Horizon Boundary	Colour Crushed		Texture	Structure	Consistence	Roots
			Dry	Moist				
LH	1-0	Abrupt, Smooth	10.0YR3.0/2.0	10.0YR2.0/1.0				
Ae	0-6	Gradual, Smooth	2.5Y6.0/2.0	10.0YR4.0/2.0	Sandy loam, Gravelly	Very Weak, Very Fine, Platy	Loose	Abundant
AB	6-14	Abrupt, Smooth	2.5Y5.0/4.0	2.5Y4.0/2.0	Loam, Gravelly	Weak, Fine, Subangular Blocky	Slightly Hard	Abundant
Bt	14-24	Gradual, Smooth	2.5Y7.0/4.0	2.5Y4.0/2.0	Silt loam, Gravelly	Moderate, Medium, Subangular Blocky	Hard	Plentiful
BC	24-32	Abrupt, Smooth	2.5Y6.0/2.0	2.5Y3.0/2.0	Loam, Gravelly	Moderate, Fine to Medium, Subangular Blocky	Hard	Plentiful
Ck1	32-54	Gradual, Smooth	2.5Y7.0/4.0	2.5Y4.0/2.0	Loam, Gravelly	Moderate, Fine, Subangular Blockey	Hard	Few
Ck2	54-75		2.5Y6.0/2.0	10.0YR4.0/3.0	Loam, Gravelly	Moderate, Fine, Subangular Blocky		Few

Physical and Chemical Data

Horizon	Depth (cm)	pH (H_2O)	pH (0.01M $CaCl_2$)	Organic Carbon %	Nitrogen %	Ca Carb. Equiv. %	Exchangable Cations (me/100g)				Cation Exchange Capacity
							Ca	Mg	Na	K	
LF	1-0	5.9	5.3	35.7	.93						
Ae	0-6	6.1	5.8	3.1	.09						
AB	6-14	5.9	5.6	1.4	.06		9.6	2.0	.06	.84	13.8
Bt	14-24	7.4	6.6	.9	.04		9.5	1.2	.22	.74	11.6
BC	24-32	7.8	6.9	1.5	.03		13.0	3.6	.13	.51	17.1
Ck1	32-54	7.9	7.1								
Ck2	54-75	7.8	7.2								

Horizon	Pyrophosphate Extractable		Elect. Cond. (MMHOS/Cm)	P1 (ppm)	S (ppm)	Mn (ppm)	Coarse Fragments				
	Fe%	Al%					Total %Vol	Gravel %	Kind	Cobble %	Kind
LF				43.1		45.6					
Ae			.44	101.4		.7					
AB			.39	79.1		.6					
Bt			.46	49.5		.4					
BC			.38	37.9		.7					
Ck1			.61	2.2		.6					
Ck2			.83	1.9							

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